

WITH "CONSOLIDATION SUPPLEMENT"

THE IRON AGE

A Review of the Hardware, Iron, Machinery

Published every Thursday Morning by David Williams Co., 232-238 William Street, New York.

Vol. LXVI: No. 26. New York, Thursday, December 27, 1900.

\$5.00 a Year, including Postage. Single Copies, Ten Cents.

Reading Matter Contents.....	page 48
Alphabetical Index to Advertisers "	139
Classified List of Advertisers.....	" 141
Advertising and Subscription Rates "	55



IRON AND STEEL
REPUBLIC IRON & STEEL COMPANY
CHICAGO, ILL. *
PRODUCTS



THE BRISTOL COMPANY,
Waterbury, Conn.
Bristol's Recording Instruments.

For Pressure, Temperature and Electricity,
Silver Medal, Paris Exposition.
All Ranges, Low Prices, and Guar-
anteed. Send for Circulars.

SAMSON SPOT CORD



Also Massachusetts and Phoenix
Brands of Sash Cord.

SAMSON CORDAGE WORKS, Boston, Mass.

TURNBUCKLES.



Branch Office, 11 Broadway, New York.
Cleveland City Forge and Iron Co., - Cleveland, O.

TURNBUCKLES.



MERRILL BROS.,
465 to 471 Kent Ave.,
Brooklyn, E.D., N.Y.

Soft Coal.

PILLING & CRANE Girard Building, Philada.
Lewis Block, Pittsburgh.

Yes, you can get on with
some other make of galvan-
ized iron—no telling where
you'll get to.

American Sheet Steel Company
Battery Park Building
New York

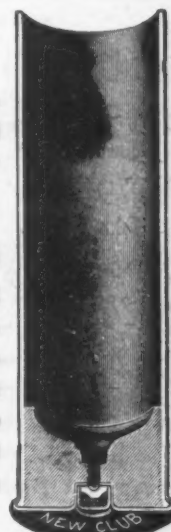


Sportsmen

Who load their own shells often find them-
selves in a locality where the use of several
different charges is almost a necessity if they
would bring down their full quota of game.

U.M.C. Empty Shells

Are adapted to the use of EVERY GRADE
OF POWDER. The closest possible atten-
tion is given to every detail in their manu-
facture, especially to the PRIMER, which
will be found absolutely reliable, and to the
construction of Bases which insure the full
carrying power of the charge for which each
is particularly designed.



Union Metallic Cartridge Co.,

Winners of Handicap 1893-94-95-97-98-99.

313 Broadway, New York.

Bridgeport, Conn.

CAHALL BOILERS

See Page 96

CAPEWELL HORSE NAILS.

NEW YORK,
PHILADELPHIA,
CHICAGO,
ST. LOUIS,
BOSTON,
DETROIT,
CINCINNATI,
SAN FRANCISCO,
PORTLAND, ORE.,
BUFFALO,
BALTIMORE,
NEW ORLEANS.

BRANCHES:



THE CAPEWELL HORSE NAIL COMPANY,
HARTFORD, CONN.



Jenkins Bros.' Valves

are manufactured of the best steam metal, and are fully guaranteed.
Why experiment with cheap valves? If you want the **BEST** ask
your dealer for valves manufactured by Jenkins Brothers. Re-
member all genuine ones are stamped with Trade Mark like cut.

JENKINS BROTHERS, New York, Philadelphia, Chicago, Boston.

**Brass Prices High So Use Bright "Swedoh" Stamp-
ing Steel. Easily Brass Plated and Save Money.** See **129**



MAGNOLIA METAL.

Best Anti-Friction Metal for all Machinery Bearings.

Fac-Simile of Bar.
Beware of
imitations.



MAGNOLIA METAL CO., 266 and 267 West St., London, Chicago, Montreal, Pittsburgh,
Owners and Sole Manufacturers **NEW YORK.** Boston, San Francisco, Philadelphia.

THE
ANSONIA BRASS
AND **COPPER CO.**
MANUFACTURERS OF
BRASS AND COPPER
Seamless Tubes, Sheets, Rods and Wire.

Ingot Copper

SOLE MANUFACTURERS

Tobin Bronze

(TRADE-MARK REGISTERED.)

Condenser, Plates, Pump Linings, Round,
Square and Hexagon Bars, for Pump
Piston Rods and Bolt Forgings.

99 John Street, - - New York.

Randolph-Clowes Co.,

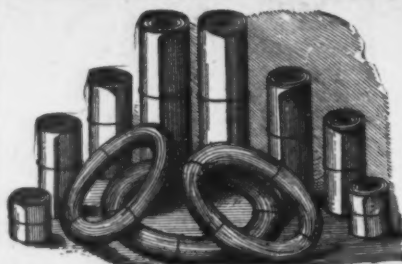
Main Office and Mill,
WATERBURY, CONN.

MANUFACTURERS OF

SHEET BRASS & COPPER.
BRAZED BRASS & COPPER
TUBES.

SEAMLESS BRASS
& COPPER TUBES
TO 36 IN. DIAM.

New York Office, 253 Broadway, Postal Tel-
egraph Bldg., Room 302.
Chicago Office, 602 Fisher Bldg.
Boston Office, Cor. Oliver and Purchase Sts.



Waterbury Brass Co.

Established 1845.

Sheet, Roll and Platers' Brass,

German Silver, Copper, Brass and Ger-
man Silver Wire, Brass and
Copper Tubing.

COPPER RIVETS AND BURS.

TAPE MEASURES,
METALLIC EYELETS,

Brass Kettles, Brass Tags, Powder Flasks,
Shot Pouches, &c.,

AND SMALL BRASS WARES OF EVERY DESCRIPTION
Cartridge Metal in Sheets or Shells
a Specialty.

DEPOTS:

60 Centre St., New York. 125 Eddy St., Provi-
dence, R. I. 38 Mechanic St., Newark, N. J.

MILLS AT WATERBURY, CONN.

DEOXIDIZED ORDNANCE and
COMPOSITION METALS

of all descriptions.
Satisfactory prices.

BRIDGEPORT DEOXIDIZED BRONZE
& METAL CO.,
BRIDGEPORT, CONN.

THE PLUME & ATWOOD MFG. CO.,

MANUFACTURERS OF

Sheet and Roll Brass

—AND—

WIRE

PRINTERS' BRASS, JEWELERS' METAL, GERMAN
SILVER AND GILDING METAL, COPPER RIVETS
AND BURS.

Pins, Brass Butt Hinges, Jack Chain, Kero-
sene Burners, Lamps, Lamp
Trimnings, &c.

20 MURRAY ST., NEW YORK.

144 HIGH ST., BOSTON.

190 LAKE ST., CHICAGO.

ROLLING MILL:
THOMASTON, CONN.

FACTORIES:
WATERBURY, CONN.

SCOVILL MFG. CO.,

Manufacturers of

BRASS

SHEET, WIRE, TUBES.

Hinges, Buttons, Lamp Goods,
Nipples, Pumps and Oilers
for Bicycles, Braziers'
Solder.

FACTORIES, WATERBURY, CONN.

DEPOTS:
NEW YORK, CHICAGO, BOSTON.

JOHN DAVOL & SONS,

AGENTS FOR

Brooklyn Brass & Copper Co.,

DEALERS IN

COPPER, TIN, SPELTER,
LEAD, ANTIMONY.

100 John Street, - New York.

Arthur T. Rutter,

SUCCESSOR TO

WILLIAM S. FEARING,

256 Broadway, New York.

*Sheet Brass, German Silver, Cop-
per, Brass and German Silver
Wire, Brazed and Seamless
Brass and Copper Tubes, Small
Tubing a Specialty. Brass and
Copper Rods, Brass Ferrules.
Sheet and Ingot Copper; Spelter,
Tin, Antimony, Lead, etc.*

THE BRIDGEPORT BRASS CO.,

BRIDGEPORT, CONN.

19 Murray St., New York.

85-87 Pearl St., Boston.

17 N. 7th St., Philadelphia.

MANUFACTURERS OF

Brass
AND
Copper

SHEET
TUBING
WIRE.

Lamp Goods of all Kinds.

BRASS AND COPPER GOODS
In Great Varieties.



Matthiessen & Hegeler Zinc Co.,

LA SALLE, ILLINOIS.

SMELTERS OF SPELTER

AND MANUFACTURERS OF

SHEET ZINC AND SULPHURIC ACID.

Special Sizes of Zinc cut to order. Rolled Battery Plates.
Selected Plates for Etchers' and Lithographers' use.
Selected Sheets for Paper and Card Makers' use.
Stove and Washboard Blanks.

ZINCS FOR LECLANCHE BATTERY.

BRASS FOUNDERS
FINISHERS J.J. RYAN & CO.

88-74 West Monroe St., Chicago.

Best Bronze, Babbitt Metals, Brass and Aluminum **CASTINGS**
On Short Notice.



Catalogue and Linenoid Pin Tray Free.



No better counter
made.

4 Wheel, \$3.00

5 Wheel, \$3.25

Guaranteed.

R. A. HART, BATTLE CREEK, MICH.

HENDRICKS BROTHERS

PROPRIETORS OF THE

Belleville Copper Rolling Mills,

MANUFACTURERS OF

Braziers' Bolt and Sheathing

COPPER,
COPPER WIRE AND RIVETS.

Importers and Dealers in

Ingot Copper, Block Tin, Spelter, Lead, Antimony, etc.
49 CLIFF ST., NEW YORK.

ELEPHANT BRAND PHOSPHOR- BRONZE.



THE PHOSPHOR BRONZE SMELTING CO. LIMITED,
2200 WASHINGTON AVE., PHILADELPHIA.
"ELEPHANT BRAND PHOSPHOR-BRONZE"
INGOTS, CASTINGS, WIRE, RODS, SHEETS, ETC.
— DELTA METAL —
CASTINGS, STAMPINGS AND FORGINGS
ORIGINAL AND SOLE MAKERS IN THE U.S.

DELTA METAL.

Illinois Zinc Company,

MANUFACTURERS OF

Spelter, Sheet Zinc, Sulphuric Acid and Acid Phosphate.

W. FISHER, Agent, 81-83 Fulton St., New York City.
Telephone, 139 John.

PERU, ILL.



OILLESS BEARINGS.

A strong letter of commendation from a firm whose reputation is "world wide" as the manufacturers of the celebrated "PEARLINE."

NEW YORK, Nov. 26, 1897.
NORTH AMERICAN METALINE CO., 43 Third St., Long Island City, N. Y.
Gentlemen: Your favor of 20th inst. received; in reply are pleased to say that your Metalined Bushings have given us entire satisfaction. We first applied them in 1896 or '97 under very trying conditions, put them in fast running loose pulleys with high tension belt, and they gave perfect satisfaction. Since then, we have extended their use throughout our works, and they have given satisfaction where ever we have placed them.
Very truly yours,
JAS. PYLE & SONS.

FOR great Tensile Strength, Elasticity and Elongation,
coupled with unusual Non-Corrosive qualities,

CASTINGS AND PROPELLER WHEELS

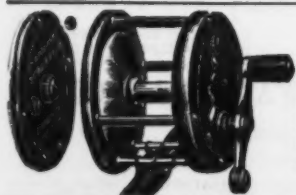
made from

PARSONS MANGANESE BRONZE

cannot be excelled. Write for particulars.

SOLE MAKERS

THE WILLIAM CRAMP & SONS SHIP and ENGINE BUILDING CO.,
PHILADELPHIA, PA.



HENDRYX

Has sold 2,000,000 standard Fishing Reels in 12 years to Domestic and Foreign Jobbing trade and will mail you any Reel you may select from our illustrated catalogue on receipt of list price, and if not satisfactory will, on return of Reel refund the money. Catalogues mailed free on application.

THE ANDREW B. HENDRYX CO., NEW HAVEN, CONN.



Best Anti-Friction Metal for all machinery bearings. For high speed and heavy crushing weight it has no equal.

THEO. HIBTZE & SON, Sole Manufacturers,
30th St. and Park Ave., St. Louis, Mo.
Manufacturers all grades Babbitt Metals, Solder, Bar Tin, Bar Lead, Lead Car Seals, Pig Tin, Pig Lead, Antimony, Copper, Spelter, etc.

GRAY IRON, BRASS, ALUMINUM AND BRONZE CASTING OF THE VERY BEST QUALITY.

Very much time saved by using clean and soft castings. A trial will convince you. Pickets and Rosettes for wire workers, catalogue of same. Nickel Plating and Japanning, Metal Pattern Making, also Bronze Tablets and Name Plates for Machinery to order. We invite correspondence.

JOHN W. CLARK, ALBANY, N. Y.

UNITED METALS SELLING CO.

11 BROADWAY, NEW YORK.

EUROPEAN AGENTS:

C. S. HENRY & CO., 12 Leadenhall St., London, E. C.

Pres., Clarke Merchant, Pres. of Merchant & Co., Inc.

International Sprinkler Co.,

517 ARCH ST., PHILADELPHIA, PA.

Has Complete WET and DRY Systems! Fully endorsed by Insurance Companies. Protected by U. S. Patent Office.

NOTE—WE INSTALL SYSTEMS COMPLETE.

20 per cent. to 70 per cent. of Insurance Saved.

A Southern Department has been established, with an office at 801 Prudential Building, ATLANTA, GA.



"INTERNATIONAL" HEAD.
THE BEST.

The American Metal Co.

(LIMITED),

Exchange Court Building, 52 Broadway, New York.
P. O. BOX 937.

COPPER, COPPER ORES AND MATTES.

Tin, Lead, Spelter, Antimony, Nickel,
Aluminum, Bullion, Iron.

ADVANCES MADE ON CONSIGNMENTS.

AGENTS FOR

HENRY R. MERTON & CO., London, Birmingham, Manchester and Glasgow.
METALLURGISCHES INSTITUT, Frankfurt-on-Main.
WILLIAMS, FOSTER & CO., Ltd., Swansea, Eng.
SOCIETE LE NICKEL, Paris, France.
BALBACH SMELTING & REFINING CO., Newark, N.J.



Phosphorized Metal Co.

Philadelphia, Pa.

Manufacturers of High Grade
Phosphor Tin,
Phosphor Bronze,
Phosphor Copper,
Manganese Copper.

LOWEST MARKET PRICES.
CORRESPONDENCE SOLICITED.

U. I. HUNGERFORD BRASS & COPPER CO.
121 WORTH STREET, NEW YORK.
Carry in Stock 100 sizes, aggregating over 125,000 lbs., of
SEAMLESS DRAWN
BRASS AND COPPER TUBES.
Regular Sizes, 1/8 in. to 6 in. dia., also Iron Pipe sizes 1/8 in. to 6 in.
SPECIAL SIZES TO ORDER.
Orders for Stock Sizes Shipped Day Order is Received.

L. E. COCHRAN, President.

G. M. McKELVEY, V. Pres.

MASON EVANS Secy & Treas.

JOHN D. PEW, Gen'l. Mgr.



SEND FOR CATALOGUE AND PRICES.



V. CRIMPED EDGE IRON.

THE YOUNGSTOWN IRON & STEEL ROOFING COMPANY.

IRON & STEEL WEATHER BOARDING.

MANUFACTURERS OF ALL KINDS OF

IRON & STEEL ROOFING & SIDING.

SPECIAL BRAND "MAHONING"

YOUNGSTOWN, OHIO.

Eastern Agents:
W. H. THOMSON & CO., Philadelphia, Pa.Chicago Office:
810-811 New York Life Bldg.

GALVANIZED & BLACK RIDGING.

PATENT COLD . . . GALVANIZING PROCESS.

We notify our customers and others that we are enlarging our Jobbing Plant to a Capacity of "SIX" 25 foot tanks and will be equipped to handle any kind of heavy work up to 25 feet in length, and also, with our special patent machinery and devices, small work of every description, such as nails, screws, bolts, etc., at very low prices. Special prices made for yearly contracts and large orders.

We furnish plants of any size and description and grant shop right and other licenses on a royalty basis.

GALVANIZING

U. S. Electro-
Galvanizing Co.

JOBGING PLANT:

108-110 W. 11th St.

MAIN OFFICE:

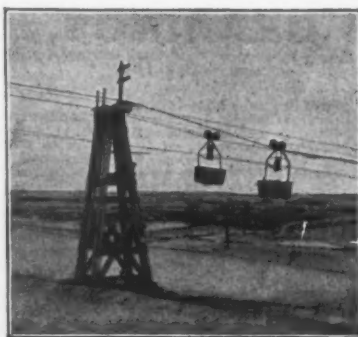
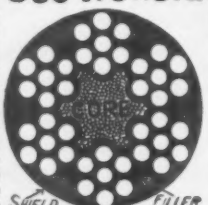
346 Broadway, New York.

Use Ironsides Paints

For Roofs, Boiler
Fronts, Stacks,
and all Metal
Work.

Ironsides Rope and
Gear Lubricants.

Get Catalogue T.
THE IRONSIDES CO.,
Columbus, O., U. S. A.



Bleichert Tramway of The Solvay Process Co.

Engineers and Contractors and sole licensees in North America for the Bleichert System. Also Wire Rope Equipments for Cable Hoist-Conveyors, Surface and Underground Haulage, Etc.

Illustrated book upon application.

NEW YORK OFFICE—Cooper, Hewitt & Co., 17 Burling Slip.

CHICAGO OFFICE—1114 Monadnock Building.

THE

BLEICHERT WIRE ROPE TRAMWAY,

and other systems of aerial transportation.

Manufactured by

THE TRENTON IRON CO.,
TRENTON N. J.

CLARK & COWLES,

Plainville, Conn.

RIVETS, METAL PUNCHING, SPRINGS.

Press Work a Specialty.

Your Dies or we can make Dies for you.
Send sample or sketch for price.

THE WAGGONER WATCHMAN CLOCK.

Latest, Simplest, Best.

REDUCES INSURANCE.

Gives a printed record on the back of the dial of the watchman's movements. The record is hidden, the dial cannot be stopped; any attempt to manipulate the clock is recorded on the dial.

Has ALARM features that are alone worth its cost. You throw away good tools and buy new types that do more work. Why not do the same with your "out of date" type of watchman clock, and get the best protection yet offered?

Endorsed by the Insurance Bureaus.

The Waggoner Watchman Clock Co.,

GRAND RAPIDS, MICH., U. S. A.



WE ARE THE ONLY
MAKERS OF
Columbia Brand
Phosphor Tin
and
Bronze Ingots.

Use Syracuse Babbitt.

It is the Best for all Machinery Bearings.

QUALITY GUARANTEED.

PRICE REASONABLE.

SYRACUSE SMELTING WORKS,
SYRACUSE, N. Y.

MONTREAL, CANADA.

Nickelized-Sheet-Zinc

(NICKELOID)

Is a highly polished, **NON-CORROSIVE** metal packed with paper between each sheet. Is being used for Wash-boards, House Numbers, Reflectors, Buttons, Name-plates, Stove boards, Refrigerator Lining, Fruit Jar Caps. Can be soldered, stamped and bent to the sharpest turn, retaining a polish like nickel-plated brass.

Zinc Polished for the Trade.

AMERICAN NICKELOID CO., PERU, ILLINOIS.

SCREENS OF ALL KINDS

Perforated Metals

of every description

THE HARRINGTON & KING PERFORATING CO.

CHICAGO ILL. U.S.A.

THE HARRINGTON & KING PERFORATING CO.

Main Office and Works, 209 North Union Street, Chicago, Ill.
Eastern Office, 284 Pearl Street, New York

BABBITT METAL FOR ROLLING MILL AND OTHER MACHINERY.

BRASS INGOTS and SPELTER.

Smelters and Refiners. Brand: GOLDEN ROD.

SCRAP METALS OF ALL CLASSES BOUGHT.

H. M. SHIMER & CO., - 1128 Cherry Street, PHILADELPHIA, PA.

SPIRAL SPRINGS

We make a specialty of making to order only a superior quality of Cast Steel Wire Springs, either for extension or compression. These Springs are all oil tempered and are made of an extra quality of wire, drawn specially for our own use, of the same grade of stock as we use for the Springs that we put in our Spring Scales.

JOHN CHATILLON & SONS,

85 to 93 Cliff St., and 12 Jacob St.,
NEW YORK CITY.

Established 1835.

SPRING COTTERS, FLAT SPRING KEYS AND FLAT RIVETED KEYS MADE TO ORDER.

Bright Iron and Brass Wire Goods.

Send for Catalogue.

All Kinds of Special Wire Goods Made to Order.

M. S. BROOKS & SONS, - CHESTER, CONN.

PRICE and QUALITY are the two essentials.

MY No. 3 BEARING METAL HAS STOOD THE TEST AND I CAN PROVE ALL I CLAIM FOR IT.

I. SHONBERG, 172 Hudson Street, N. Y., Manufacturer and Dealer in Metal.

Send for Samples.

WE MAKE SMALL SPRINGS OF EVERY DESCRIPTION.

THE WALLACE BARNES CO.

Bristol, Conn., U. S. A.
Established 1857.

Send samples and write for prices.
HAVE YOU OUR CATALOG?

OIL TEMPERED SPRINGS
FOR ORGANS - PIANOS - GOVERNORS - BICYCLES AND AGRICULTURAL IMPLEMENTS AND SPECIAL SPRINGS - MADE FROM CRUCIBLE SWEET STEEL

SABIN MACHINE CO. MONTPELIER VT.

GRISWOLD WIRE CO.,

MANUFACTURERS OF
CROSS HEAD, IMPROVED, MONITOR, HOOK AND SINGLE LOOP

STEEL WIRE BALE TIES.

Wire Straightened and cut to lengths, Wire, Wire Nails, etc.

BRADDOCK, PA.

CARY SPRING WORKS,

240 and 242 W. 29th St., N. Y. City.

WIRE AND SPRINGS OF EVERY DESCRIPTION.

E. JENCKES MFG. CO.

PAWTUCKET, R. I.

CRESCENT COAT AND HAT HOOKS,
BRIGHT WIRE GOODS,
COTTERS AND KEYS,
SPECIAL WIRE WORK TO ORDER.

Sole Selling Agents, **JOHN H. GRAHAM & CO.,**
113 Chambers St., New York.

ELECTRO GALVANIZING WORKS BLACKMAN & KING.

Specialty made of Galvanizing
Steam, Water and Drainage Fittings,
Nails, Screws, Bolts and Nuts,
Springs, All Kinds of Castings and Wrought Iron Work.

801 Greenwich St., Bet. Jane and 12th Sts.,
New York.

ELECTRO GALVANIZING

ON ALL KINDS OF
Iron, Steel, Screws, Nails, also
Steam and Drainage Fittings.

EMPIRE PIPE BENDING AND SUPPLY CO.,

235 to 253 Park Ave.,
Telephone "B Main."

BROOKLYN, N. Y.

WE WANT AGENTS TO SELL OUR IRON FENCE

The largest mfrs of Iron Fence in the U. S.

Architectural and Ornamental Iron Work, Jails, etc.

Write for Catalogue

THE STEWART IRON WORKS, CINCINNATI, OHIO, U. S. A.

The Manufacture of Varnishes, Oil Crushing, Refining and Boiling and Kindred Industries. Describing the manufacture and chemical and physical properties of spirit varnishes and oil varnishes; raw materials; resins; solvents and coloring principles; drying oils, their extraction, properties and applications; oil refining and boiling; the manufacture, employment and testing of various varnishes. Translated from the French of Ach. LIVACHE. Greatly extended and adapted to English practice, with numerous original recipes by John Geddes McIntosh. Illustrated, 8vo, 408 pages, cloth.....\$5.00

For sale by **David Williams Co., 232 William St., N. Y.**

R. H. WOLFF & CO., Ltd.,

MANUFACTURERS OF

ALL FINE GRADES OF COLD ROLLED STEEL,

For Corset, Band Saws, Clock and Watch Springs and all parts thereof, and all other special purposes.

FINEST QUALITIES OF STEEL WIRES,

Round, Square, Flat and all other shapes, for Cables, Wire Ropes, Spokes, Needles, Piano Wire, and all other special purposes, tempered and untempered, etc.

Works: 118th, 117th and 116th Sts. and East River,

NEW YORK CITY.



WE make all kinds of
Steel Metal goods
as well as Wire goods.
All our work is done by
Automatic Machines,
and consequently cheap
in price and good in
quality.

R. C. JENKINSON & CO.,
289-297 Washington St.,
NEWARK, N. J.



A few of the Wire shapes we have made.

"AMERICAN"

TRANSMISSION

"A LITTLE BLUE BOOK ON
ROPE TRANSMISSION,"
Second Edition—AUGMENTED.
Published by
THE AMERICAN MANUFACTURING CO.

THE
AMERICAN
MANUFACTURING
COMPANY,

65 Wall Street, NEW YORK.

ROPE.

Established 1848.
DUNBAR BROTHERS,
MANUFACTURERS OF
Steel (Oil Tempered) Springs
ALL KINDS OF
SMALL SPRINGS
MADE FROM
SHEET STEEL and
STEEL and BRASS WIRE.
BRISTOL, CONN.

WM. McFARLAND,
IRON FOUNDER,
TRENTON, - N. J.
CHILLED CAST WIRE DIES
A SPECIALTY.

Any Size or Style Made at Short Notice.

THE
WIRE GOODS COMPANY,
Worcester, Mass.
Hardware and Kitchen Wire Goods.
Specialties to Order.
EVERYTHING IN WIRE.

WATERBURY ROPE CO.

FACTORIES, Brooklyn.

OFFICE, 69 South St., N. Y.

MAKERS OF

WIRE ROPE

OF ALL KINDS.

Also Manila, Sisal, Russia and
American Cordage and Binder Twine.

WIRE In Steel

NORWAY
CHARCOAL Iron.

Straightened and Cut
All Lengths.

Screw Rods, **WOOD SCREWS**, Iron and Brass.

TRANSON LIFTERS.

BICYCLE CHAINS for Bicycles and Mechanical Purposes.
READING SCREW CO., Norristown, Penna.

THE STEWART WIRE COMPANY. - Office and Works,
EASTON PENNA.

BRIGHT
ANNEALED
COPPERED
TINNED

WIRE

—ALL SIZES—
—ALL VARIETIES—

LIQUOR
BRIGHT
SPRING
SCREW
RIVET

[Wire Straightened and Cut to Specified Lengths.]

**SUCCESSFUL
SANITARY VENTILATION**
Can now be accomplished.

"NATIONAL WIRE AND VENTILATOR WORKS"
HOWARD & MORSE.
45 FULTON ST., NEW YORK CITY
MANUFACTURERS OF EVERY VARIETY OF

WIRE-CLOTH, WIRE-WORK
AND
ARTISTIC METAL WORK.
ALSO
MECHANICAL VENTILATING APPLIANCES
INCLUDING
BLACKMAN'S PATENT
POWER VENTILATING
WHEEL AND
THE PATENT HIGH SPEED
SOLANO STEAM
ENGINE.

EXCLUSIVE MANUFACTURERS OF THE Heavy Steel Tempered
National Battery and Bolting Wire-Cloth.

**UNIFORM
BUILDING VENTILATION**
Can now be guaranteed.

BRODERICK & BASCOM ROPE CO.,
SOLE MANUFACTURERS OF

Established 1875

"PATENT STEEL"
ROPE.

THE MOST DURABLE ROPE MADE; IT HAS NO EQUAL,
SEND FOR ILLUSTRATED CATALOGUE.

St. Louis Mo.

A. LESCHEN & SONS ROPE CO.,
Manufacturers of
FINLAYSON WIRE ROPE

**PATENT FLATTENED
STRAND WIRE ROPE.**

Tramway.
The only satisfactory Tramway on the
market.
Estimates Given on Application.

**AND ALL KINDS OF
WIRE ROPE,**
Manila, Sisal, Blocks, Etc.

920-922 North Main Street, ST. LOUIS, MO.

Branch Office, 47-49 South Canal St., Chicago, Ill.

1848.

WIRE ROPE
HAZARD MFG CO.

INSULATED WIRES and CABLES. HARD and SOFT DRAWN COPPER WIRE.
Warerooms: **50 DEY STREET, NEW YORK.** Works: **WILKESBARRE, PA.**

WILLIAMSPORT WIRE ROPE CO.,
WILLIAMSPORT, PA.

1848.

MANUFACTURERS OF
IRON & CRUCIBLE-CAST STEEL
WIRE ROPE.

OF ALL KINDS AND SIZES AND FOR ALL PURPOSES.

Macomber & Whyte
Rope Co.,
19 South Canal Street, CHICAGO.

STEEL IRON
WIRE ROPE
Manilla Rope, Blocks, Sheaves,
Galvanized Wire, Steel Strand.

OUR TRADE MARK PROTECTS YOU.

The Kidd Bros. & Burgher Steel Wire Company,
McKEE'S ROCKS, PA.

Sole Manufacturers of **KIDD SPECIAL DRILL RODS, NEEDLE
WIRE AND HIGH GRADE STEEL WIRES.**

**HOWSON
AND
HOWSON**

**Counsellors at Law,
Solicitors of Patents.**

PHILADELPHIA
West End Bldg., 32 So. Broad St.
NEW YORK
Potter Building, 38 Park Row.
WASHINGTON
National Union Bldg., 913 F St.

PATENTS

U. S. and Foreign Secured.

Trade Marks and Copyrights. **Twenty Years' Experience.** Send model or sketch and brief description of your invention and secure report as to patentability. Expert searches and opinions as to Scope, Validity and Infringement. Patent Causes Prosecuted and Defended. Practice in U. S. Supreme, Circuit and Circuit Appeals Courts, and U. S. Patent Office.

Send for "Plain Words about Patents," Free.

PATENT PRACTICE EXCLUSIVELY.
References Furnished on Application.

E. B. STOCKING, Attorney at Law,
611 F ST., N. W., WASHINGTON, D. C.

Estey Wire Works Co.

65 FULTON St., NEW YORK,

Manufacturers of every variety of

WIRE CLOTH & WIRE WORK

Bank and Office Railing,
BRASS AND IRON WORK,
RIDDLES AND SCREENS.

SEND FOR CATALOGUES.

PAUL GOEPEL

Counselor at Law,
Registered Patent Agent,
290 BROADWAY, Dun Building, NEW YORK.
Special experience in and connections for
obtaining Patents in foreign countries.

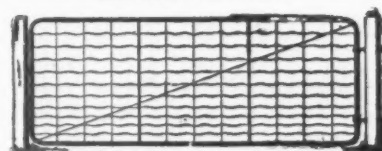
JANNEY, STEINMETZ & CO..
Seamless Cold Drawn Steel Shells, Cylinders
and Tanks, for Air, Water, Steam, Gas, Soda,
Ammonia or Fluids under pressure and explosives.
Seamless Tubing, Heavy Section Tubes, Hy-
draulic Forgings for Cream Separator Bowls.
INGOT ALUMINUM for STEEL MAKERS.
DREXEL BUILDING, Philadelphia.

H. P. & H. F. WILSON,
MANUFACTURERS OF

WIRE BALE TIES

For Baling Hay, Straw, Jute, Moss, Rags, Paper
Stock and all Compressible Material,
577-579 Tenth Ave., - New York City.

THE FROST WIRE FENCE CO.,
MANUFACTURERS OF



Steel Farm Gates, Wedge-Lock Spring Wire Fence
and Hard, Coiled, Galvanized, Steel Wire in the Roll.
Welland, Ontario, Canada. Cleveland, O.

THE SUMMIT WIRE CO.

CUYAHOGA FALLS, OHIO.

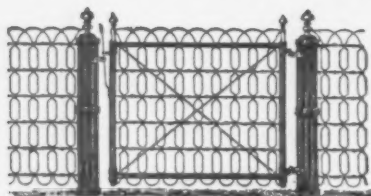
Manufacturers of

WIRE

TINNED { BROOM WIRE,
MATTRESS WIRE,
LANTERN WIRE,
BRIGHT MARKET WIRE,
COPPERED MARKET WIRE,
ANNEALED STONE WIRE.

WIRE STRAIGHTENED
AND CUT TO LENGTHS.

Rossman's Lawn Fence.



Made especially for Lawns, Parks, Cemeteries and all Public and Private Grounds. Has no equal. Thoroughly Galvanized and made of best Bessemer No. 6 Steel Wire. Cheaper and just as substantial as Iron Fence.

Write for Catalogue.

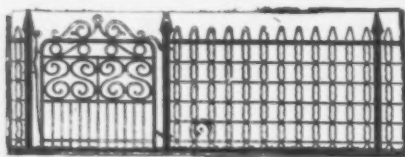
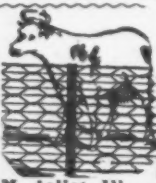
Rossman Woven Wire Fence Co.,
ROSSMAN, COLUMBIA CO., N. Y.

ADAM

THE FENCE MAN
Makes Woven Wire Fence
that "Stands Up." Can-
not Sag.

Get his new catalogue. It tells
all about The Best Farm
Fence Made. Also Steel
Lawn and Cemetery Fences.

W. J. ADAM, Joliet, Ill.



HARTMAN Steel Rod
Picket Fence
For Lawns, Parks, Cemeteries, School
Grounds; also Tree Guards, Window
Guards, Wire Mats, Woven Wire Fence,
etc.

HARTMAN MFG. CO.,
Of Ellwood City, Pa.
N. Y. Office, 309 B'way, N. Y. City.



IRON & WIRE FENCING,
ELLIS & HELFENBERGER,
200 SENATE - INDIANAPOLIS, IND.

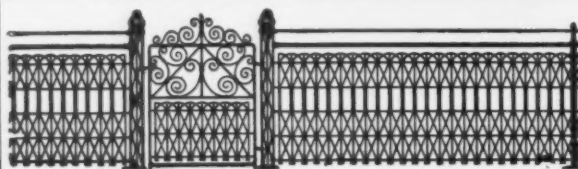
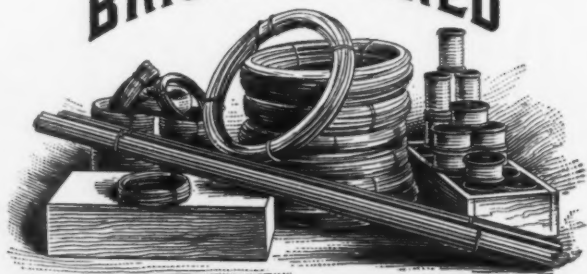
GEO. W. PRENTISS & CO., - HOLYOKE, MASS.

MANUFACTURERS OF
Iron and Steel

WIRE

of every description
for
General and Special
Purposes.

BRIGHT & TINNED

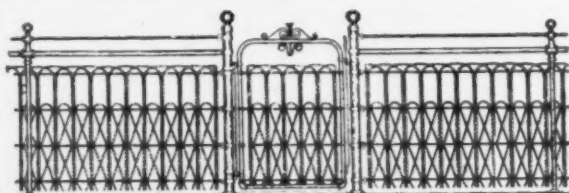


UP-TO-DATE MFG. CO., - TERRE HAUTE, IND., 959 No. Tenth Street.

DWIGGINS WIRE FENCE
CO., Anderson, Ind.

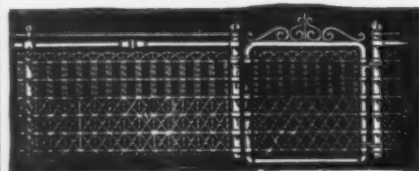
Wire Fencing, Ready Made, for
Lawn, Farm and Railroad.

Write for Catalogue.
Agents Wanted.



LAWN FENCE,
WINDOW GUARDS,
OFFICE RAILING,
TREE GUARDS,
FARM FENCE.

Send for Catalogue and
Discount Sheet.



ORNAMENTAL FENCE

25 different designs, they are all steel
and cheaper than wood fence. Special
prices to Churches and Cemeteries. Write
us for catalogue.

KOKOMO FENCE MCH. CO.,
Kokomo, Ind., U. S. A.

ANYTHING IN ARTISTIC AND LIGHT

IRON, WIRE AND BRASS WORK

Such as Iron and Wire Fences of every description, Office and Bank Railings, Window Guards, Wire Escapes,
Iron Stairways, Roof Crestings, Iron Doors and Shutters, Flower Stands and other Floral Designs, Iron Vases,
Urns, Chairs and Settees, General Builders' Iron Work, etc., etc.

100-page illustrated catalogue, with close prices, sent free.

ORNAMENTAL IRON & WIRE CO., - - - **Chattanooga, Tenn.**

Largest concern of the kind in the entire South.



ALBERT BERTHE,

Iron Work, Single and Double Gates,
Balconies and Railings, Cemetery
Enclosures, Green Houses of
every description in general
iron work.

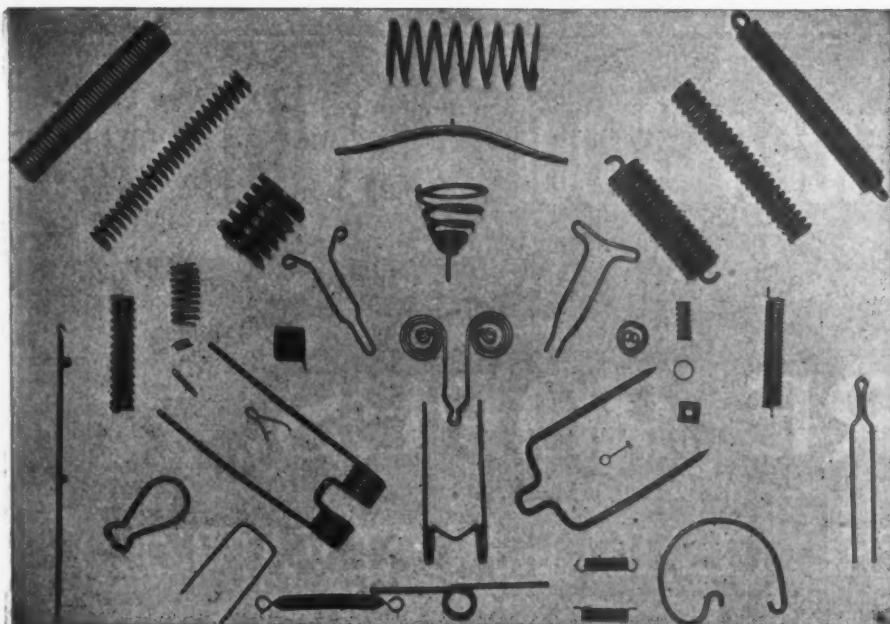
26-28 Poplar St., - Jersey City, N. J.



STANYON-MILLER ENGINEERING COMPANY
Empire Building, PITTSBURG, PA.

Rod, Wire and Nail Mills, Galvanizing Plants.

We Build Plants Complete from Ground Up.



SPRINGS.

Improved Spiral and Flat Springs, for Machinery, Agricultural Implements, Valves, and every service a spring can perform.

SEND SAMPLE FOR PRICE.

WIRE SPECIALTIES,

Any shape or style required.

WIRE

In Coils and Straight Lengths.

MORGAN SPRING CO.,
Worcester, Mass., U. S. A.

Drawers and Rollers of
IRON AND STEEL WIRE
For all purposes.

SEND FOR CATALOGUE "A."

BARBED WIRE

BALE TIES,

WIRE NAILS,



FENCE WIRE,

STAPLES.

Write us for Prices. Prompt shipment made direct from our warehouses.

The Ludlow-Saylor Wire Co., - St. Louis.



To Dealers:

You've heard of P & B Ruberoid Roofing, haven't you? Yes! Well, so has everyone else! And there are few dealers that would not jump at the suggestion we'd like to make to you! Ruberoid sells like the proverbial "hot cakes," and every day you do not have it to sell you lose money. We'll help you to handle it successfully if you will tell us your wish. Ruberoid is the original prepared FELT roofing and has a world wide reputation for effectiveness and durability. We'd like to talk at you. Let's hear from you.

The Standard Paint Company, 77-79 JOHN STREET, NEW YORK.

J. B. & J. M. CORNELL,

MANUFACTURERS OF

Annealing Pots for Wire Manufacturers.

We make a specialty of an extra strong, heat-resisting metal peculiarly adapted for this purpose.

WRITE FOR PRICES.

WORKS: West Point Foundry, Cold Spring-on-Hudson. OFFICE: 26th Street and 11th Avenue, New York City.



Kilmer's Stock or Hog Fence.

Strongest and will last the longest. It perfectly adjusts itself over hilly or uneven ground. The only Stock Fence manufactured that will absolutely overcome expansion or contraction, therefore will not break, sag, or get loose. Agents wanted in every county. We also manufacture Wire Lawn Fencing, Bale Ties, Nails, Etc. Write for catalogue. KILMER WIRE MFG. CO., Chicago.

ARROW BRAND

ASPHALT READY ROOFING.



ASPHALT READY ROOFING CO., 136 Water St., N. Y. Send for Samples and Pamphlet.

ART METAL WORK IN BRASS, STEEL AND IRON. **E. T. BARNUM,** DETROIT, MICH.

See Adv. 1st Each Month.



American Steel & Wire Co.,

NEW YORK,
Empire Bldg.

CHICAGO,
The Rookery.

SAN FRANCISCO,
8 and 10 Pine St.

DENVER,
809 17th St.

WIRE ROPES,

IRON and STEEL, PLAIN and GALVANIZED.

For TRANSMISSION, HOISTING, HAULAGE.

For Mining, Cableways, Logging, Ships' Rigging, Mooring and
Towing, Dredging, Etc.

EXTRA FLEXIBLE ROPES A SPECIALTY.

Write for Catalogue and Prices.



"JUNIATA"

HORSE AND MULE SHOES.

Made at the celebrated "JUNIATA IRON WORKS."

Juniata Iron Shoes,

Juniata Steel Shoes,

Juniata Toe Calks.

ARE ALL LEADERS—IN QUALITY AND SATISFACTORY RESULTS.

Write for Catalogue and Prices to

American Steel & Wire Co.

CONTINUOUS MILLS

FOR BILLETS, MERCHANT BAR, RODS,
HOOPS, AND COTTON-TIE.

WIRE-DRAWING MACHINERY---FOR STEEL, COPPER OR BRASS.

MORGAN CONSTRUCTION COMPANY,

WORCESTER, MASS., U. S. A.

WIRE MILLS

AND CHAIN MACHINERY.

DESIGNED AND BUILT BY

THE TURNER, VAUGHN & TAYLOR CO.,

CABLE ADDRESS:
"VAUGHN, CUYAHOGA FALLS, O."
A. B. C. CODE USED.

CUYAHOGA FALLS, OHIO, U. S. A.

M. M. S. POULTRY FENCING.

These Patents are owned and controlled by the
De Kalb Fence Co., and Union Fence
Co., of De Kalb, Illinois.



Patented July 24, 1894.

[TRADE MARK.]

Patented July 6, 1897.

Every roll genuine M. M. S. Fencing will
contain this trade mark
in colors.

Requires but few posts and no top
or bottom rail. Is stronger and better,
and completed fence costs from 40 per
cent. to 50 per cent. less than any other.

Also a large line of *Hog, Sheep,
Field and Cattle Fencing* to meet
all requirements, and Steel Web Picket
Fencing with gates, posts and rail, for
lawns, cemeteries, etc.,

DE KALB FENCE CO.,

Main Office and Factories:

DeKalb, Illinois, U. S. A.

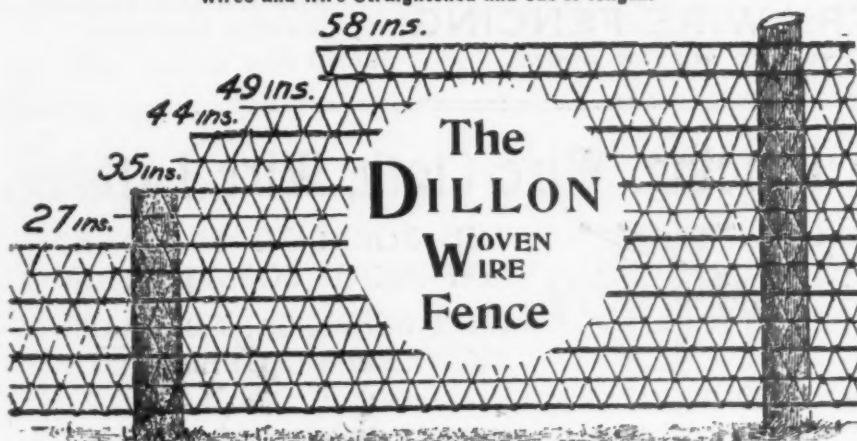
Selling Agents:

Rotherham, Wood & Co., Melbourne, Australia.
Buhler & Co., Buenos Aires, Argentine Republic.

Branch Offices and Warehouses:

154-156 First St., San Francisco, Cal.
304 Delaware St., Kansas City, Mo.
171 Main Street, Dallas, Texas.

Barbed Wire Staples, Steel Wire Nails, Steel Bale Ties, Annealed, Bright and Galvanized
Market Wire, Woven Wire Fence, Copper, Iron and Steel Rods, Special
Wires and Wire Straightened and cut to length.



DILLON-GRISWOLD WIRE CO.
STERLING, ILLS.

Garry Iron and Steel Roofing Co.

Steel Buildings,
Roof Trusses,
Structural
Iron Work,
Dryer Cars,
Corrugated
Sheet Metal
Coverings.

Cor. Coe and Lake Sts.,

CLEVELAND, OHIO.

Wire Cloth, Netting, Fencing and Perforated Metal.

We Manufacture a Complete Line of these Goods, Including

"CLINTON" Brand.

Painted Window Screen Cloth.
Galvanized Poultry Netting.
Wire Lath. Woven Wire Fence.
Electrically Welded Wire Fence.

"SILVER FINISH" Brand.

Galvanized Poultry Netting.
Galvanized Window Screen Cloth.
Galvanized Fruit Drying Cloth.

PERFORATED METAL FOR

Coal, Ore and Gravel Screens, Spark Arresters, Kiln Floors, Filter Press Plates, Centrifugal Machines, Fanning Mills, Etc., Etc.

CLINTON WIRE CLOTH CO.,

CLINTON, MASS.

BOSTON.

NEW YORK.

CHICAGO.

SAN FRANCISCO.

WIRE CLOTH, NETTING.

Pearl Wire Cloth.
Galvanized Steel Wire Cloth.
Galvanized Wire Poultry Netting.
"Cottage" Lawn and Garden Fencing.
"G & B" Web Wire Fencing.
Sieves, Riddles, Screens.
Gilbert's Rival Ash Sifter.
House Furnishing Wire Goods.

The **Gilbert & Bennett Mfg. Co.**

FENCING. (GATES, FENCING TOOLS.
STABLE FIXTURES, RAILINGS, WINDOW GUARDS.
WIRE LATHING WITH HAMMONDS METAL FURRING.
THE OLDEST AND LEADING MANUFACTURERS OF GALVANIZED WIRE GOODS IN AMERICA.

WIRE GOODS, WIRE WORK.

44 Cliff Street,
NEW YORK.
153 Lake Street,
CHICAGO.
Factories: { Georgetown, Conn.
Wireton (three miles from Chicago), Ill.
Established 1818.

WRIGHT & COLTON WIRE CLOTH CO.



POULTRY NETTING. All meshes and sizes wire. Galvanized "Before" and "After" weaving.

WIRE CLOTH. Galvanized, Tinned and Black. Brass and Copper. Rust Proof.

WIRE. Annealed, Bright, Coppered, Tinned and Galvanized. Cold Rolled. Riddles, Coal and Sand Screens, Galvanized Clothes Lines, Conductor Strainers, etc. Wood Screws.

Factories: { Palmer, Mass.
Worcester, Mass.

GENERAL OFFICE, Worcester, Mass.
WAREHOUSE, 79 Lake St., Chicago.

"PENNSYLVANIA WIRE WORKS."

EDWARD DARBY & SONS, Philadelphia, Pa.

MANUFACTURE

BRASS
COPPER
STEEL
IRON
GALVANIZED

Wire Cloth.

Painted WINDOW SCREEN
Galvanized " "
Bronze " "

Wire Cloth.

GALVANIZED WOVEN WIRE FENCING.

" **POULTRY WIRE FENCING.**

Sieves, Riddles, Coal and Sand Screens.
Wire and Iron Goods of every description.

ADJUSTABLE WINDOW SCREENS AND SCREEN DOORS.

SEND FOR CATALOGUE.

Wire Netting, Wire Fencing, Wire Cloth, Wire Lathing,

COAL AND SAND SCREENS,
FRUIT DRYING CLOTH,
FLY-SCREEN CLOTH,



THE ROEBLING STANDARD
FIRE-PROOF CONSTRUCTION.
IRON, STEEL, GALV'D, BRASS,
BRONZE AND COPPER CLOTH.

HARDWARE GRADES

The New Jersey Wire Cloth Co., Trenton, N. J.

NEW YORK;

CLEVELAND,

CHICAGO,

SAN FRANCISCO

WICKWIRE BROTHERS, CORTLAND, N. Y.

MANUFACTURERS OF

WIRE CLOTH AND NETTINGS.

Cortland ^{Painted Wire Cloth.} **Wickwire** ^{Bronze Wire Cloth.} **White Metal Finish** ^{Wire Cloth.} **Wickwire** ^{Hoz. Netting.}

Made from Hard Drawn Steel Wire.

Made from Hard Drawn Bronze Wire.

Made from Hard Drawn Galvanized Steel Wire.

Galvanized Before or After Weaving.

TINNED, BRIGHT BLUED, BRASS, COPPER WIRE CLOTH, FOR SPECIAL PURPOSES.

CORN POPPERS, DISH COVERS, METALLIC AND SQUARE COAL SIEVES, FLOUR SIEVES.

NATIONAL WIRE CORP., NEW HAVEN, CONN.,

Manufacturers of

WIRE, WIRE RODS AND WIRE NAILS.

Fence, Market, Galvanized, Screw, Bolt, Telephone and Telegraph

WIRE

Straightened and Cut Wire 1 in. and smaller

Special Wire For all Purposes.

Eastern Agents, JOHN WALES CO., 141 High St., Boston, Mass.

Send for Prices.

MICHIGAN WIRE CLOTH CO.,MANUFACTURERS OF **WIRE CLOTH OF ALL KINDS**

From BRASS, COPPER, STEEL, IRON, GALVANIZED, TINNED and BRONZE WIRE

Including PAINTED, GALVANIZED and BRONZE WINDOW SCREEN CLOTH.

ESTABLISHED 1863.

WRITE FOR CATALOGUE.

500 HOWARD ST., DETROIT MICH

ESTABLISHED 1828.

SPENCER WIRE COMPANY, Worcester, Mass.

Manufacturers of

Iron and Bessemer Steel Wire of all kinds.

FINE WIRE A SPECIALTY.

Mills at Worcester and Spencer, Mass.

No order too small for our best attention. Write us for prices and particulars.

1879

RIPLEY & BARTLETT,

1900

MFRS. OF

TACKS

INQUIRE FOR PRICES.

PLYMOUTH, MASS., U. S. A.

HIGHEST SPEED

Tack Machines

Ryan's Patents.

WM. A. SWEETSER, 89 Montello St., BROCKTON, MASS.

NEW FREEDOM WIRE CLOTH CO.,

MANUFACTURERS OF

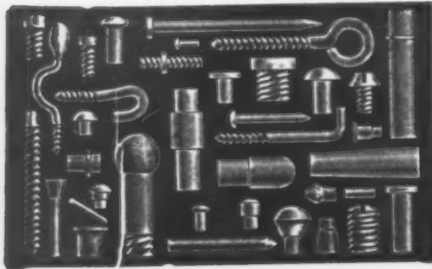
"SUMMIT" BRAND

SCREEN WIRE CLOTH.

MADE FROM HARD DRAWN STEEL WIRE. PAINTED BLACK, GREEN, OR DRAB.

Main Office and Works

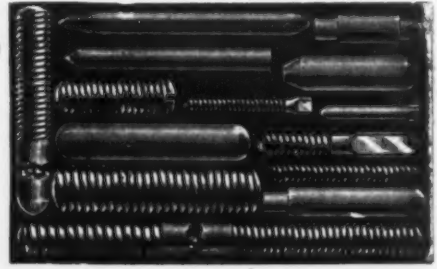
NEW FREEDOM, PA.



Iron and Brass Rivets, STUDS, PINS, SCREWS, &c.

For Manufacturers of Light Hardware.

BLAKE & JOHNSON,
WATERBURY, CONN.



GRAND CROSSING TACK CO., Grand Crossing, Chicago, Ill., U. S. A.



RIVETS,
STAPLES,
WIRE NAILS,
SHOE NAILS,
TACKS.

Our Rod and Wire Mills are now in full operation and we are well equipped to furnish

Wire **RODS,** BESSEMER and **WIRE** OF VARIOUS SHAPES
and OPEN HEARTH,

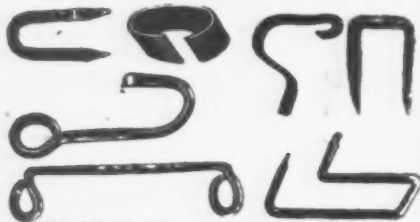
For information concerning RODS and WIRE, address

TELEPHONE, 2529 CENTRAL.

N. D. PRATT, 91 Lake Street, CHICAGO.

E. H. TITCHENER & CO.,
BINGHAMTON, N. Y.

STAPLES AND



WIRE SHAPES

Factories, { Binghamton, N. Y.
Chicago, Ill.

DIAMOND TACK
AND NAIL WORKS,
RAYNHAM, MASS.



MANUFACTURERS.
SEND FOR QUOTATIONS.

**WIRE NAIL
MACHINERY.**

Improved Perkins Pattern.
All Sizes—3d. to 20d.

H. J. MILLER, Bridgewater, Mass.

COBB & DREW, T
FACTORIES: A
PLYMOUTH, MASS., and C
ROCK FALLS, ILL. K
IRON, BRASS and COPPER RIVETS,
NAILS and DOUBLE POINTED TACKS.
S **STAPLES, BURRS, WASHERS.** S

1880
The Plymouth Mills,
RIVETS, TACKS, STAPLES, SMALL WASHERS,
BURRS AND ESCUTCHEON PINS.
Plymouth, - - - Mass.

IF IN WANT OF
TACKS, NAILS, STAPLES, &c.

WRITE TO
MILWAUKEE TACK CO., Milwaukee, Wis.

SHELTON COMPANY. ESTABLISHED 1836.
TACKS, SMALL NAILS. Etc.,
CARRIAGE. TIRE and STOVE BOLTS.

Factories, SHELTON, CONN.

NEW YORK OFFICE and WAREHOUSE, 64 READE ST.

RIVETS



**Pump
Chain**

Rockford Bolt Works,
20 Mill Street, ROCKFORD, ILL.

All kinds of Bolts, Lag Screws,
Rivets, Washers and odd
Bolt Work.

Write for our Prices.



Mention THE IRON AGE.

Connecting Bridges



IT IS OFTEN DESIRABLE TO CONNECT THE DIFFERENT FLOORS OF SEVERAL BUILDINGS

in a large manufacturing plant, to facilitate communication between different departments without the necessity of going up and down stairs.

The illustration is taken from a photograph, and shows three bridges connecting two different buildings of The Winchester Repeating Arms Company, of New Haven, Conn.

In the present case, only the upper bridge was covered, but often it is desirable to cover the sides as well as the roof, to prevent goods being damaged or spoiled while being transported from one building to the other.

Where the openings entering to the bridge are protected by our corrugated iron doors, the danger from fire passing from one building to the other along the floor of the bridge is entirely eliminated. In fact, where the bridges are made entirely of iron with the exception of the floor, the danger from fire is very small. Often, where the distance between buildings is great, it is found advisable to put in one or more supports so as to shorten the length of the spans.

*Investigation is invited.
Please Address*

**American Bridge
Company** EAST BERLIN,
CONN.

Tapping,
Screw Slotting,
Screw Assembling
and
Riveting Machines.

HARVEY HUBBELL. MACHINERY & TOOLS

BRIDGEPORT, CONN.

Brass and Iron
Machine Screws,
Nuts and Washers.

SEND FOR CATALOGUE.

Agents,

Manning, Maxwell & Moore, New York, Chicago.

Chandler & Farguhar, Boston.

SAM'L HALL'S SONS, 229-233 West 10th St., New York.

Established 1839.



MANUFACTURERS OF SUPERIOR QUALITY

Machine Bolts, Lag Screws, Washers

BRADDOCK MACHINE & MANUFACTURING CO.

Engineers, Founders and Machinists,
BRADDOCK, PA.

*Rod Mill Plants, Wire Mill Plants, Nail Machines,**Barb Wire Machines, Galvanizing Plants.*

Wire Drawing Machinery, Flange and Compression Couplings, Hangers and Pillow Blocks, Pulleys
and Shafting, Power Transmission Machinery, Air Compressors.

NUT & WASHER MFG. CO.,
Milwaukee, Wis.



MANUFACTURERS OF
Wrought and Steel Plate Washers,
Felloe Plates, Burrs, &c.

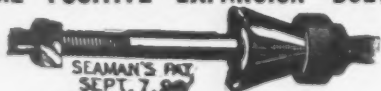
CORRESPONDENCE REQUESTED.

NUTS..
AND
BOLTS

National Elastic Nut Co.,
MILWAUKEE, WIS.

We make a specialty of Square and Hexagon Hot-Pressed Nuts (Elastic and Common); Machine Bolts, Track Bolts, etc., to large users at lowest prices. Our Elastic Self-Locking Steel Nut never works loose, and is the strongest, best and cheapest Nut on the market. Our Elastic Nut Track Bolt makes the best Rail fastening. Write for prices.

THE POSITIVE EXPANSION BOLT

**"CAN'T SLIP."**

Mfg. by DANIEL G. SEAMAN & CO.,
1835 Hutchinson St., Phila., Pa. Write for prices.
For sale by NEAL & BRINKER, 15 Warren St., New York

BEST STOCK. PERFECT GOODS.



SEND FOR BOOK ON BOLTS TO

THE

Franklin Moore Co.,
Winsted, Conn.

Pacific Coast Office, 105 Front St., San Francisco, Cal.

In writing for free
book, please men-
tion *The Iron Age*.

Pittsburgh Screw & Bolt Co.

MAKERS OF

Set Screws,
Cap Screws,
Coupling Bolts,
Milled Stud Bolts,
Semi-finished Nuts,
Case-hardened Nuts.

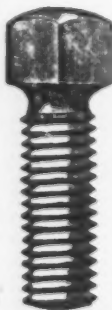
Also

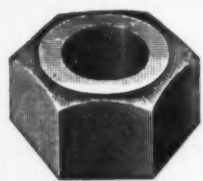
Special Work in Iron,
Steel or Brass made
on Screw Machines.

Square Head Bolts,
Hexagon Head Bolts,
T and Special Head
Bolts,
Rough Studs, etc., etc.

OFFICE AND WORKS:

Liberty Ave. and 25th St.,
Pittsburgh, Pa.





**The Milton
Manufacturing Co.,**
MILTON, PENNSYLVANIA.

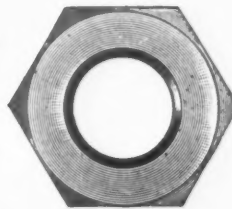
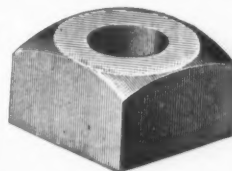
Cold Punched

PLAIN, CHAMFERED, SEMI-FINISHED
AND CASE HARDENED
ALSO, HOT PRESSED



Wrought and Steel Washers.
Cold Punched Nuts a Specialty.

N
U
T
S

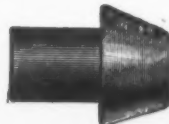


3lb

4lb

5lb

6lb

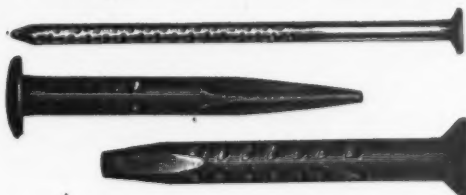


C.C. & E.P. TOWNSEND,

NEW BRIGHTON, PA.

MANUFACTURERS OF

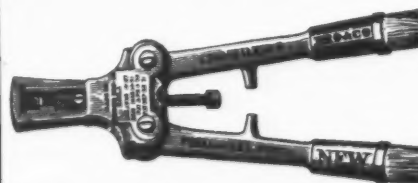
RIVETS, WIRE & WIRE NAILS.



FRANKLIN S. MILES,
Manufacturer of
SCREWS
OF EVERY DESCRIPTION.
403 Quarry St., - Philadelphia, Pa.

RHODE ISLAND TOOL CO.
PROVIDENCE, R. I.

COUPLING BOLTS.
LONG MILLED BOLTS.



Bolt and Rivet Clippers,

For Cutting off the ends of Bolts and Rivets,
Liberal discounts to the trade.

CHAMBERS BROTHERS COMPANY,
32d St., Below Lancaster Ave.,
PHILADELPHIA, PA.

OHIO.

PENNA.

NEW YORK.

7 Factories.

KEGS.

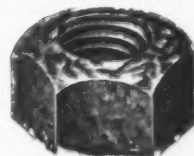
20,000 Daily.

For Nails, Spikes, Bolts, Nuts, Rivets and Horse Shoes.

THE EDWIN BELL COMPANY,

17th STREET, SOUTH SIDE, PITTSBURGH, PA.

ALL GRADES OF FINISHED
NUTS
AND AUTOMATIC COLD PRESS
NUT MACHINES.



MANUFACTURED BY
DUNHAM NUT CO.,
Unionville, Conn., U. S. A.

Best Books for an Iron and Steel Works Chemist.

Recommended by ALBERT LADD COLBY.

We quote from an article by Mr. Colby published in THE IRON AGE of June 15, 1899, and append a list of the books which are recommended collectively for the iron and steel works chemist, with their prices:

"There ought to be a good long shelf of books in the office or balance room of every iron and steel works' laboratory, for they are as essential to its proper equipment as the apparatus and chemicals. If granted the opportunity the chemist of an iron or steel works can give practical aid in so many lines that his employer will find it to his direct advantage to encourage his chemist by placing the best books on the subject at his disposal. * * * The writer based the recommendations on a personal examination of all of the books printed in English on analytical chemistry and allied subjects, 112 in number, on a long experience in the use of many of them and on an intimate knowledge of the many ways in which a chemist can aid his employer in the manufacture of iron and steel. * * * The most successful professional chemists are those willing to still class themselves as students, and it is safe to say that in every one of the books recommended in this article at least one good new idea may be found, which if applied by the chemist in his laboratory work will soon save his employer many times the cost of the book."

1 Arnold, J. O. Steel Works Analysis....	\$3.00	15 Classen, A. Quantitative Chemical Analysis by Electrolysis.....	\$3.00
2 Blair, A. A. The Chemical Analysis of Iron	4.00	16 Smith, E. F. Electro-Chemical Analysis...	1.25
3 Lord, M. W. Notes on Metallurgical Analysis, Chemical.....	1.25	17 Gill, A. H. Gas and Fuel Analysis for Engineers.....	1.25
4 Methods of Iron and Steel Analysis About Pittsburgh.....	1.00	18 Hempel, W. Methods of Gas Analysis.....	1.90
5 Crookes, Wm. Select Methods of Chemical Analysis.....	8.00	19 Winkler, Clemens. Handbook of Technical Gas Analysis.....	3.00
6 Fresenius, C. R. A System of Instruction in Quantitative Chemical Analysis.....	6.00	20 Poole, Herman. The Calorific Power of Fuels.....	3.00
7 Phillips, H. Joshua. Engineering Chemistry	4.00	21 Snow, W. B. Steam Boiler Practice.....	3.00
8 Stillman, T. B. Engineering Chemistry....	4.50	22 Comey, A. M. Dictionary of Chemical Solubilities.....	5.00
9 Cairns, F. A. Manual of Quantitative Chemical Analysis.....	2.00	23 Vulté, H. T., and Neustadt. Laboratory Manual of Inorganic Preparations.....	2.00
10 Cheever, B. W.—Smith, F. C. Select Methods in Quantitative Analysis.....	1.75	24 Clarke, F. W. The Constants of Nature, Part V., New Edition.....	2.00
11 Talbot, H. P. Introductory Course in Quantitative Analysis.....	1.50	25 Cremer, J. H., and Bicknell, G. A. Chemical and Metallurgical Handbook.....	3.00
12 Thorpe, T. E. Quantitative Chemical Analysis.....	1.50	26 Kent, Wm. The Mechanical Engineer's Pocket Book.....	5.00
13 Ostwald, W. Scientific Foundations of Analytical Chemistry.....	1.60		
14 Sutton, Francis. Systematic Handbook of Volumetric Analysis.....	4.50		
			\$78.00

These 26 books, amounting to \$78.00, will be sent prepaid for \$70.00. Separately the books are furnished at the list prices, prepaid.

DAVID WILLIAMS COMPANY, Publishers and Booksellers,

232-238 William Street, New York.

EXPANSION BOLTS.

The Best Bolt on the Market.
MFD. BY
THE McCABE HANGER MFG. CO.
223-243 West 22d St., N. Y.
WRITE FOR PRICES.

"DIAMOND" EXPANSION BOLT.

ONLY 2 PARTS.
Simplest Expansion Bolt in the market.
HENRY B. NEWHALL, 26 Cortlandt St., N. Y.
Tel. 224 Cortlandt.
925

Cap and Set Screws
SPECIAL SCREWS TO ORDER.
LOW PRICE.
BEST QUALITY.
HIGH FINISH.
QUICK DELIVERY.
OLNEY & WARRIN,
36 Dey St., New York.

**PORT CHESTER
BOLT & NUT CO.,**
PORT CHESTER, N. Y.

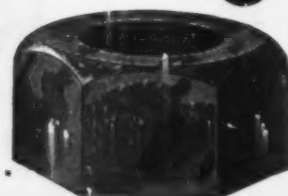
MANUFACTURERS OF

Cold Punched, Chamfered and Trimmed, Case
Hardened and Semi-Finished

NUTS.

Bicycle Supplies,
&c., &c.

Tire Bolts a Specialty.



ALFRED M. COATS, Pres.

JACOB STEPHANS, Gen'l Manager.

E. SHIRLEY GREENE, Secy.

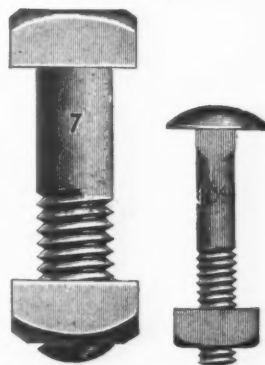
J. MILTON PAYNE, Treas.

WM. H. HASKELL MFG. CO.,

SUCCESSORS TO

WM. H. HASKELL CO., and PAWTUCKET NUT CO.,
MANUFACTURERS OF

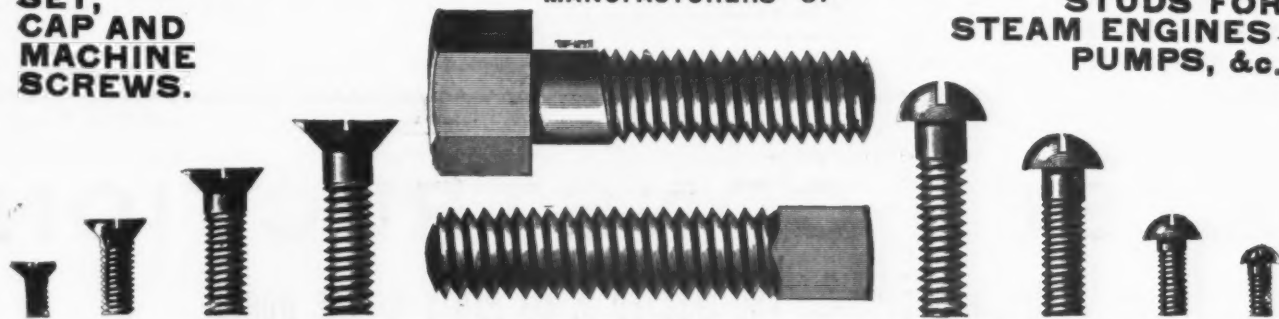
Bolts, Coach Screws, Set
Screws, Cap Screws,
Nuts, Washers, Chain
Links, Stirrups, Levers, Clearer Springs, Etc.
PARTICULAR ATTENTION PAID TO SPECIAL WORK.



Office and Works, 451 Main Street, - - PAWTUCKET, R. I., U. S. A.

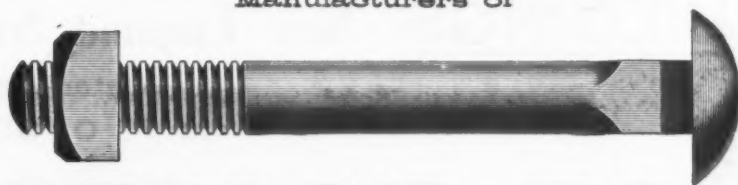
WORCESTER MACHINE SCREW CO., Worcester, Mass.SET,
CAP AND
MACHINE
SCREWS.

MANUFACTURERS OF

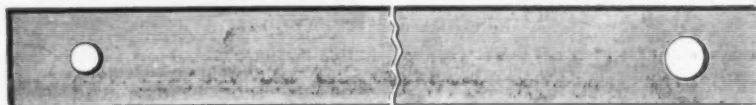
STUDS FOR
STEAM ENGINES.
PUMPS, &c.**RUSSELL, BURDSALL & WARD,**

PORT CHESTER, N. Y.

Manufacturers of

***CARRIAGE BOLTS***

AND BOLTS OF EVERY DESCRIPTION.

Galvanized and Plain Cross Arm Braces, Bolts,
Washers, Fitter Drive Lag Screws,Pole Steps, Guy Rods, Guy Clamps, Thimbles, etc.
M. LANZ & SONS, PITTSBURG, PA.

WILSON & SMITH, Worcester, Mass.

Metal Punching and Die Work.

Nuts AND Washers

SPECIALTIES IN LINE OF PRESS WORK.

SET, CAP and
MACHINE
SCREWS,Milled Coupling
Bolts, etc.

94-108 W. WASHINGTON ST. CHICAGO.

Sole Mfrs. of the Genuine
Huntington Emery
Wheel Dresser.
Hexagon Nuts,
Finished and
Case Hardened
Bicycle Parts.

Have You TRIANGLE FEED

Seen Our

for Tack Machines?

IT IS A WONDER!!

GUARANTEED INCREASE 25% IN SPEED.

KIMBALL BROS. & SPRAGUE,
BROCKTON, MASS.**EXPANSION BOLTS.**

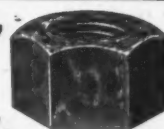
For fastening all kinds of structure to brick
and stone work.
STEWART & ROMAINE MFG. CO.
SOLE MANUFACTURERS. Philadelphia.

EXPANSION BOLTS

For fastening all kinds of structure to brick and stone work
Patentee and Mfr. **ISAAC CHURCH,**
Send for Catalogue A. Toledo, Ohio.



**McCLOUD,
CRANE
&
MINTER
COMPANY,**



Manufacturers,
WORCESTER, MASS.



Building, 94 ft. x 500 ft., recently completed for Stanley Electric Mfg. Co., Pittsfield, Mass.

Boston Bridge Works,

BOSTON, MASS.

Engineers and Contractors

FOR ALL KINDS OF

STRUCTURAL STEEL WORK,

Bridges, Steel Buildings, Roof

Trusses, Etc.

Designs and Estimates Free of Cost.

D. H. ANDREWS,

Proprietor.

THOS. B. RITER, Pres.

WM. G. COFFIN, Vice-Pres

JOHN S. CHAIG, Sec'y and Treas.

ROBERT A. MCKEAN, Gen. Mgr.

STEEL CONSTRUCTION

IN ALL BRANCHES.

BUILDINGS DESIGNED AND ERECTED IN ALL PARTS OF THE WORLD.

Roof Frames, Trusses and Girders, Blast Furnaces and Steel Works, Cupolas, Ladles,
Converters, Boilers, Tanks and Heavy Plate Work, Gas Holders, Purifiers, etc.,
Open Hearth Furnace Casings, Chimneys, Riveted Pipe, Corrugated Iron.

RITER-CONLEY MFG. COMPANY, Pittsburgh, Pa., U. S. A.

NEW YORK OFFICE: 39-41 CORTLANDT STREET.

STEEL BUILDINGS AND BRIDGES.

New England Structural Co.,

Boston Office:

18 P. O. SQUARE.

Ornamental Iron Work,
Bronze Work.

WORKS,
EVERETT, MASS.

A. S. MILLER, JR., Treasurer.

R. H. BROWN, Chief Engineer

Eastern Bridge and Structural Co.,

Engineers, Contractors, and Manufacturers of

STEEL STRUCTURAL WORK OF EVERY DESCRIPTION.

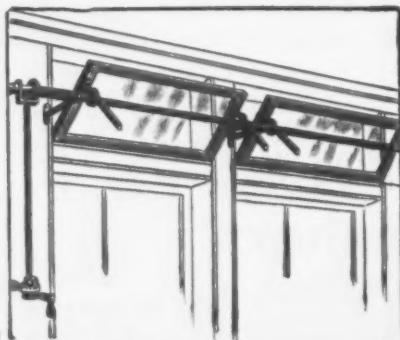
Steel and iron frame work for buildings, roofs, railroad and highway bridges. Plans and estimates furnished. Write us.

58 Front St., Worcester, Mass.

Works beside tracks of Fitchburg and B & M. Railroads
Worcester, Mass.

For Operating Windows in Monitor Roofs, MACHINESHOPS.

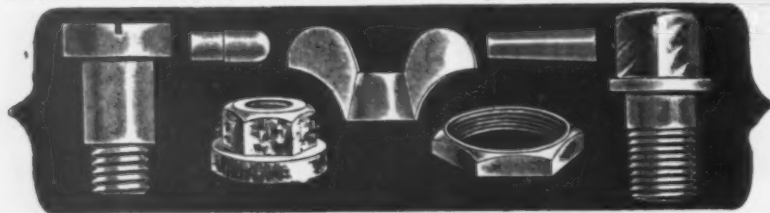
TRANSOMS
and
SKY LIGHTS
S. E. A. ORMSBY,



in
Churches
and
Schools.

Melrose, Mass.

PHILADELPHIA MACHINE SCREW WORKS, 624-626 Race St., Philadelphia.



Manufacturers of all kinds
of Special Machine Screws
and Studs, Thumb Screws
and Nuts, Bicycle and Elec-
trical Works

Corrugated, and all Other Shapes of Iron
Roofing and Siding.



Iron Buildings, Roofs, Doors, Shutters, Cornices,
Skylights, Bridges, &c.

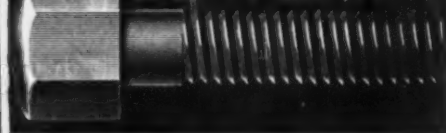
Moseley Iron Bridge and Roof Co.,
Office, 39 Cortlandt St., Room 128, NEW YORK.

STEEL FRAME MILL BUILDINGS,

Tanks for Water, Gas or Oil,
Sheet and Plate Iron Work,
Corrugated Iron,
Water Filters, 10 to 10,000 gal. capacity.

WM. B. SCAIFE & SONS, - Pittsburgh, Pa.

NIAGARA SCREW CO.
BUFFALO, N.Y.



Set Screws, Cap Screws,
Studs, Etc.

All "Milled From Solid Bar."

NATIONAL TUBE COMPANY

MANUFACTURERS OF

BLACK AND GALVANIZED

Wrought Merchant Pipe

ALL KINDS, SIZES 1-8 TO 30 INCHES.

BOILER TUBES.

Mild Steel and Charcoal Iron for Stationary, Locomotive and Marine Work.

CASING, TUBING AND DRIVE PIPE FOR WELL PURPOSES.

GAS AND OIL LINE PIPE.

Cylinders Lapwelded and Seamless, tested 100 lbs. to 3,700 lbs., for Compressed Air, Carbonic Acid Gas, Anhydrous Ammonia, Etc., Etc., Etc.

Water and Gas Mains.

CONVERSE AND MATHESON, LEAD JOINT, PIPE FOR MAINS.

SEAMLESS TUBES, SHRAPNEL, PROJECTILES AND MISCELLANEOUS FORGINGS.

OFFICE OF
PRESIDENT AND TREASURER,
Havemeyer Bldg., New York.

OFFICE OF
MERCANTILE AND MANUFACTURING DEPT'S.
Conestoga Bldg., Pittsburgh, Pa.

— LOCAL SALES OFFICES —

Havemeyer Building, New York.

95 Milk Street, Boston.

267 So. 4th Street, Philadelphia.

Conestoga Building, Pittsburgh.

Western Union Building, Chicago.

— FOREIGN OFFICE —

Dock House, Billiter Street, London, E. C., Eng.

TELEGRAPHIC ADDRESS, - TUBULIFORM, LONDON.

American Steel Hoop Company

General Offices Battery Park Building New York

MANUFACTURER

BAR IRON

Common Refined and "BB" Iron

Flats Rounds Squares Ovals Channels

Chain and Rivet Iron

Bolt and Nut Iron

"STAR" and "EAGLE" Horse Shoe Iron

Skelp Iron &c

BAR STEEL

Bessemer and Open Hearth

Flats Rounds Squares Ovals

Angles Channels Special Shapes

Round Edge Steel Tire

Agricultural Shapes &c

BANDS and HOOPS

Bessemer and Open Hearth

All widths and gauges

Steel Skelp Hame Back

Tongue Cap Cotton Ties &c

DISTRICT SALES OFFICES

Pittsburg

Empire Building

Philadelphia

Land Title Building

Boston

No. 8 Oliver Street

Cincinnati

Chamber of Commerce Building

Chicago

Marquette Building

St. Louis

Fullerton Building

Cleveland

Williamson Building

St. Paul

Endicott Building

San Francisco

No. 23 Davis Street

New Orleans

Hennen Building

Montreal

Temple Building

FOREIGN SALES OFFICE

London, E. C., 78 Gracechurch Street

American Sheet Steel Company

Battery Park Building New York

Manufacturers of all varieties of

Iron and Steel Sheets

Black and Galvanized

Plain and Painted

Flat, Corrugated and "V" Crimped

Apollo Best Bloom Galvanized Sheets

W. Dewees Wood Company's Planished Iron

W. Dewees Wood Company's Refined Iron

Wellsville Polished Steel Sheets

DISTRICT SALES AGENTS

STOCKTON & BRAINARD, Marquette Building, Chicago
W. J. WETSTEIN & JOHN W. GOOD, Security Building, St. Louis
S. J. WATERMAN, Neave Building, Cincinnati
HOGE & SWIFT, Portland, Oregon
T. H. SPEDDY, San Francisco
F. A. GOODRICH & COMPANY, Chamber of Commerce, Detroit

T. W. SIMPERS, Land Title Building, Philadelphia
F. C. MILLIKEN, Times Building, Pittsburgh
S. L. MITCHEL, Hennen Building, New Orleans
W. T. SHANNON, 34 West Ninth Street, Chattanooga
LEE CHAMBERLAIN, Los Angeles
L. A. HASTINGS, 1622 Arapahoe Street, Denver.
B. & S. H. THOMPSON & COMPANY, Montreal, Canada

American Tin Plate Company

MANUFACTURERS

Tin Plate



Terne Plate



.. and ..

Black Plate



GENERAL OFFICES:

Battery Park Building, NEW YORK CITY.

Tennessee Coal, Iron & Railroad Company,

General Offices, BIRMINGHAM, ALABAMA.

MAKERS

Basic Open Hearth Steel.

Blooms, Billets and Slabs.

Foundry, Forge and Basic Pig Iron.

Merchant Bar-Iron and Steel.

Steel Castings.

Spiegeleisen & Ferro Manganese.

MINERS AND SHIPPERS

Coal, Coke, Ore, Limestone and Dolomite.

Export Facilities through Ports of New Orleans, Mobile, Pensacola, Charleston, Port Royal, Brunswick, Savannah and Norfolk.

Sloss Sheffield Steel and Iron Company, Sloss Iron and Steel Company,

BIRMINGHAM, ALABAMA.

Manufacturing following well known brands of foundry iron:

"Sloss," "Florence," "Sheffield," "Lady Ensley."

Selling Agents:

Hugh W. Adams & Company, 15 Beekman Street, New York City.
Hugh W. Adams & Company, 65 Water Street, Boston, Mass.
D. L. Cobb, 1489 Monadnock, Chicago, Ill.
D. L. Cobb, 305 Security Bldg., St. Louis, Mo.
J. K. Dimmick & Company, 911 Drexel Bldg., Philadelphia, Pa.
Stevenson, Field & Company, 45 Board of Trade, Columbus, Ohio.
C. L. Baum, Salt Lake City, Utah.
J. R. Lehmer, 1212 Farnam Street, Omaha, Neb.
Martin Pipe & Foundry Company, San Francisco, Calif.
Hasam & Moreno, la Calle de las Damas 5, City of Mexico.

SHIPPERS OF

FOUNDRY COKE FROM WASHED COAL,

CELEBRATED

SLOSS PRATT STEAM AND

BLOCK DOMESTIC COAL.

Cable address SLOSS, BIRMINGHAM, using Lieber's A-1, Watkins, Western Union Telegraphic and the Atlantic Cable Directory Codes.

GALVANIZED STEEL SHEETS

Corrugated Sheets, Galvanized or Painted

BLACK STEEL AND IRON SHEETS
ROOFING AND SIDING

McCULLOUGH IRON CO., - Wilmington, Delaware.

PIERSON & CO.,

29 Broadway, New York, N. Y.

SOFT STEEL
HOOPS AND BANDS.

Correspondence Solicited.

WILLIAM H. WALLACE & CO.

IRON AND STEEL

66 Broadway, - New York.



HIGH GRADE POLISHED SHAFTING
AND SPECIAL SHAPES.

YOUNGSTOWN, O.

United States Cast Iron Pipe and Foundry Co.,
Manufacturers of

CAST IRON PIPE.

Eastern Office, Land Title Bldg., Broad and Chestnut Sts., Philadelphia, Pa.

Cable Address, McNealpipe, Phila.

AMERICAN IRON AND STEEL MANUFACTURING CO.

LEBANON, PENNSYLVANIA.

Proprietors and Operators of the Plants formerly owned by Pennsylvania Bolt and Nut Co., J. H. Sternbergh & Son,
National Bolt, Nut and Rivet Works, Lebanon Iron Co., and East Lebanon Iron Co.

MANUFACTURERS OF

HOT PRESSED NUTS.

NEW YORK SALES OFFICE, 11 Broadway.
BALTIMORE SALES OFFICE, 806 Equitable Building.

ATLANTA SALES OFFICE, 1016 Prudential Building.
SAN FRANCISCO SALES OFFICE, 105 Front St.

JONES & LAUGHLINS, LTD.,

AMERICAN IRON AND STEEL WORKS, PITTSBURGH.

Branch House, Chicago, Ill. Branch Office, 220 Broadway, New York.

We invite the attention of Bolt, Rivet and Chain Manufacturers to the following lines of our product:

Our **Bolt Steel** is of the free-cutting quality—which means good threads and larger production.

Our **Rivet Steel** is of superior quality—which means good rivets.

Our **Chain Steel** is of the soft, weldable quality—which means increased product and lowest cost of manufacture.

We make all sizes, either in Bessemer or Open Hearth qualities. Can now furnish 5-16 and larger sizes in long coils.

INQUIRIES SOLICITED.

ROBT. L. HENRY, Pres.

D. B. SCULLY, Vice-Pres.

THEO. D. MORGAN, Gen. Mgr.

WALTER E. STOF, Sec. & Treas.

CHAMPION IRON & STEEL CO.,

MUSKEGON, MICH., Manufacturers of

TIN PLATE, TERNE PLATE, BLACK PLATE and SHEETS.

Four Mills now running; four more Mills building. This Company has its own Open Hearth Steel Plant and Bar Mill. Also manufacturers of Merchant Bars, Steel and Iron.

YOUR INQUIRIES SOLICITED.



Hahn's Latest Improved Watchman's Time Detector

With Safety Lock Attachment.
Highest Award at Columbian Exposition.

This Clock is neat, thoroughly reliable and very durable. Cannot be tampered with. Price moderate. Is adapted to 6, 12 or 18 stations, having a different key for each. Re-registering is done by numbers from 1 to 6, 1 to 12 and 1 to 18, each station having its number. Send for circulars, prices and further particulars.

C. NANZ & CO. 127 Duane St., New York, U.S.A.

PHENIX TUBE CO.,
Brooklyn, N. Y.

BRASS and BRONZE Iron Lined TUBES

for Bedsteads and Railings. Prices
on application.

VIRGINIA IRON, COAL AND COKE CO.,

Miners, Manufacturers and Shippers of

Pig Iron, Open Hearth Basic Steel,

PIG IRON BRANDS:

Dora,
Watts,
Crozer,
Bristol,
Graham,
Radford,
Max Meadows,
Buena Vista—Basic,
Embsville—Malleable,
Carasie—Bessemer and
Low Phos.
Reed Island—Cold Blast
Charcoal.

Foundry
and
Forge.

Horse Shoes,

Merchant Bar Iron,

Cast Iron Pipe,

Coal and Coke.

GENERAL OFFICES:

BRISTOL, VA.-TENN.

TOMS CREEK:

Steam and Domestic Coal,
Foundry and Furnace
Coke.

RADFORD
PIPE WORKS
Cast Iron Pipe.

CABLE ADDRESS:

IRONVIRGIN—BRISTOL.

TESTED CHAINS ONLY.

BRADLEE & CO., EMPIRE CHAIN WORKS,

Beach St. and East Susquehanna Ave., - - Philadelphia.

SOLE MANUFACTURERS OF THE D. B. G. SPECIAL CRANE CHAIN.

CHAINS FOR FOUNDRY CRANES AND SLINGS. STEEL AND IRON DREDGING, SLOPE AND MINING
CHAINS, SHIP'S CABLES, AND MARINE RAILWAY CHAINS.

PLANISHED STEEL BARS.
ACCURATE, STRAIGHT, POLISHED,
ROUND, SQUARE, FLAT, HEXAGON
For Shafting, Machine Rods, Keys, Guides, Screw Rods &c.
THE C. PARDEE WKS PERTH AMBOY, N.J.

**PURE ROLLED
ZINC
PLATES.**

Cut to any dimensions for Batteries,
Boilers and Special Uses.

E. PHILLIPS & SONS,
So. Hanover, Mass., U. S. A.
Prices on Application.

"ANALYSES OF PIG IRON,"

COLLECTED AND PUBLISHED BY

SEYMOUR R. CHURCH,

307 Sansome St., San Francisco.

SEND FOR CIRCULAR.

Price, { \$2.50 to U. S. and Canada, } Postage Paid
12c. Foreign Countries.

J. K. DIMMICK & CO.,
PIG IRON.

911 Drexel Building, PHILADELPHIA

Send for Catalogue.



Automatic Micrometer Gauge for
Rolling Hot Plates. American and
Foreign Standards. Haines
Gauge Co., 502 Provident Bldg.,
4th & Chestnut Sts., Philada., Pa.

Alabama Consolidated Coal & Iron Co.,
BIRMINGHAM, ALA.

Manufacturers of the Celebrated Brands of Foundry Iron:

Clifton and Etowah

Also Miners and
Shippers of . . .

HIGH-GRADE STEAM COAL

And Makers of the
Well Known . . .

"STANDARD" FOUNDRY COKE.

Selling Agents for the
North and West:

Matthew Addy & Co.

Cincinnati, Chicago, St. Louis, Pitts-
burgh, Philadelphia, New York.

Mobile Coal Company, agents for coal and coke in the Mobile territory.

HARDWARE CHAIN.

JAS. MCKAY & CO.,

Pittsburgh, Pa.,

Manufacturers of Coil, Crane, B. B. B. Crane and Steel Chain. All Chain tested
before shipping and Certificates of Tests furnished. Write for prices.

Canadian Representative, HUGH RUSSEL, 185 St. James St., Montreal, Can.

FRANKFORD STEEL COMPANY,
ELLWOOD CITY, LAWRENCE CO., PA.

STEEL FORGINGS

Railroad, Marine and Machine. All shapes.

HEAVY SHAFTING.

IN THE ROUGH, ROUGH TURNED or FINISHED.

CHICAGO OFFICE, 1020-1021 Monadnock Bldg.,
Frederick H. Mason, Mgr.

Office, Fidelity Mutual Building.
PHILADELPHIA.

LUKENS IRON AND STEEL CO.

A. F. HUSTON, PRESIDENT.

CHAS. L. HUSTON, VICE-PRESIDENT.

JOS. HUMPTON, SECRETARY AND TREASURER.

STEEL PLATES

SHEARED

—AND—

UNIVERSAL MILL

No. 10 gauge to 2" thick. Widths 126" upward.

Widths 10" to 48" (3 high rolled.) $\frac{1}{4}$ " thick and over.

... THE FIRST TO MAKE BOILER PLATES IN AMERICA. ...

MAIN OFFICE and WORKS, Coatesville, Pa.

PHILADELPHIA OFFICE:
Fidelity Building, Rooms 405-6-7-8,
N. Broad St. above Arch St.

NEW YORK OFFICE:
29 Broadway.

BOSTON OFFICE:
8 Oliver Street.

NEW ORLEANS OFFICE and WAREHOUSE:
626-630 South Peters St.

BALTIMORE OFFICE:
102 South Street.

CINCINNATI:
CHARLES NEBLETT.

CHICAGO:—A. M. CASTLE & CO.,
54-60 Canal Street.

CLEVELAND:
J. F. CORLETT, Perry Payne Bldg.

FRANK SAMUEL,
Harrison Building,
15th & Market Sts.,
Philadelphia.

LOW PHOSPHORUS

PIG IRON—.03 or under.
SCRAP—.03 or .05 or under.
ORE—For O. H. and Furnace Use.
MELTING BAR—
Open Hearth and Bessemer Billets.
Skeip, Muck Bars and Scrap, Foundry and Bessemer Pig Iron.
Syracuse Tube Co.'s Tubes and Pipe.

THE PHOENIX IRON CO.,
410 WALNUT ST., PHILADELPHIA,

MANUFACTURERS OF

Steel Structural Shapes of Open
Hearth Steel by Acid and Basic
Processes. Subject to Specifications

Beams, Channels, Deck Beams, Angles, Tee Bars, Zee Bars, Bulb Angles; Buckle Plates and other shapes, Round,
Flat and Square BARS of all sizes.

SPECIALTIES:—Phoenix Columns and Upset Eye Bars; Fire Proof Buildings; Roof Trusses, Girders, Joists and
Riveted Work of every description.

NEW YORK OFFICE, 49 William Street; WESTERN OFFICE, A. C. STITES, The Rookery, Chicago.

NATIONAL STEEL COMPANY

BATTERY PARK BUILDING, NEW YORK

Manufacturers of

RAILS

BESSEMER AND OPEN HEARTH BILLETS

SHEET AND TIN PLATE BARS

London Office: 77-78 Gracechurch St., London, E. C.

Passaic Rolling Mill Co., Paterson, N. J.

ROLLED STEEL BEAMS,

Channels, Angles, Tees, &c. Riveted Work, Forgings, Eye Bars, &c.

HIGH GRADE MERCHANT BAR IRON.

NEW YORK OFFICE, - - - ROOMS 151 AND 152, No. 45 BROADWAY.
BOSTON OFFICE, No. 31 STATE ST.

PIG IRON,
COAL and
COKE

Blast Furnace,
Coke Ovens and Mines,

LEETONIA,
OHIO.

The CHERRY VALLEY IRON CO.,
Murtland Building, PITTSBURG.

SUPERIOR CHARCOAL IRON CO.,
GRAND RAPIDS, MICH.

"Pioneer," "Antrim," "Elk Rapids,"
Lake Superior Charcoal Pig Iron.

Red River Iron Co.'s
HIGH SILICON PIG.

HICKMAN, WILLIAMS & CO.,
CHICAGO, THE ROOKERY. EXCLUSIVE AGENTS, LOUISVILLE
Kenyon Bldg.
PROMPT DELIVERY

Code—A B C 4th Edition. Morel & Nott's, Libby's.
GEO. G. BLACKWELL, SONS & CO., Limited,
IMPORTERS, MANUFACTURERS, MERCHANTS,
THE ALBANY, LIVERPOOL, ENGLAND.
Write or Cable for Prices and Particulars.

"LION BRAND" ALLOYS FOR STEEL.

Ferro-Chromium, Cr. 70%, C. 1%
Ferro-Tungsten, any %.
Molybdenum-Nickel.
S. A. M. Premier Deoxidiser.
Molybdenum Metal (Fused and Powder).
Tungsten Metal, 95-98%.
Ferro-Nickel, Ferro-Boron.
Ferro-Titanium, Chrome-Nickel.

LEADING LINE IN ORES:
MOLYBDENITE,
WOLFRAM, SHELLITE,
CHROME, MANGANESE,
NICKEL, COPPER, ETC.

"MATCHLESS BRAND"
Magnesite, Chrome and Bauxite Bricks.

Charles E. McInnes,
112 N. Broad St., Philada., Pa.

Boiler Tubes, Angles
and Rivets.

HOBSON, HOUGHTON & CO.

Successors to FRANCIS HOBSON & SON, DON STEEL WORKS, SHEFFIELD.

Sole Manufacturers of

Hobson's "Choice"  Extra Best Tool Steels, "Warranted Best" Cast Steels for Tools, etc.

HOBSON'S 'CHOICE' Extra Quality Needle Wire.

"SOHO" Special Self Hardening Steel.

Bright Drill Rods, Highest Quality and Accuracy.

WAREHOUSE, 98 John St. New York.

CHAS. HUGILL, Agent.

S. & C. WARDLOW, SHEFFIELD, ENGLAND.

Manufacturers of the Celebrated Cast and Double Shear Steel.

in Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Razors, Carvers, Butchers' Knives, Files, Band Saws, Clock, Watch and all other Springs; also Sole Makers of the Special Brand **"TOUGH"** Cast Steel for Leather Splitting and Machine Knives of every description and for Turning and

Office and Warehouse, 95 John St., New York.

Frank S. Pilditch, Agent.

JONAS & COLVER CONTINENTAL STEEL WORKS, Sheffield, England.

MANUFACTURERS OF ALL KINDS OF STEEL.

Tool Steel, Drill Rods, Needle Wire, Hot Rolled Sheet Steel, Cold Rolled Steel for Corset Springs, Band Saws, Clock and Watch Springs and Parts, and all other purposes.

HERMANN BOKER & CO., 101 & 103 Duane Street,

Formerly CARL F. BOKER,

Sole Agents and Importers of Steel and Crucible Wire Rods, &c.

JESSOP'S STEEL

Established 1774.

MANUFACTURED BY

WM. JESSOP & SONS, L'D.

of BEST QUALITY,

in BARS, SHEETS and PLATES.

Large assortment of sizes in stock at

91 JOHN ST., - - - NEW YORK.

And other Agencies.

SHEFFIELD,
ENGLAND.

GRAND PRIX,
Paris, 1900.

CHAMPION TOOL STEEL.

Extra, Special and Double Special

Highest Quality Drill Steel,

MFD. BY

THE BENJ. ATHA & ILLINGWORTH
COMPANY.

ATHA AIR HARDENING TOOL STEEL

C. S. & O. H. DIE BLOCKS.

NICKEL STEEL.

FORGINGS AND CASTINGS.

All kinds of lower grade Steels.

DENMAN & DAVIS, Apts.

Office and Warehouse, 85 and 87 JOHN STREET, N. Y.

WHEELOCK, LOVEJOY & CO.,

23 Cliff St., NEW YORK.

35 Oliver St., BOSTON.

FIRTHS STEEL.

AGENCIES:

FIRTH-STERLING STEEL CO.,
Tool Steel.

THOS. FIRTH & SONS, Ltd.,
Tool and Sheet Steel.

GLOBE WIRE CO., Ltd.,
Drill Rods.

SWEDISH IRON AND STEEL.

BOLE, ROSS & CO.

802 and 624 Park Building, Pittsburgh, Pa.

IRON AND STEEL.

AMERICAN

PIG IRON STORAGE WARRANT CO.,

(Bank of America Building,) 44 Wall St., N. Y.
Correspondence of Furnaces invited

STAYBOLT, BOILER BRACE, RIVET, TOOL AND AXLE IRON.

VULCAN

HIGH GRADE

IRON



LOCKHART

SOFT

STEEL

SQUARE ROOT AND FILLET ANGLES,
HEXAGONS AND SMALL CHANNELS.

W. P. SNYDER & CO., Bessemer and Open-Hearth Steel.

BESSEMER PIG, BILLETS, AND SHEET BARS.

Offices, German National Bank Building, - PITTSBURGH, PA.

WILLSON ALUMINUM CO.,

Manufacturers of **FERRO-CHROMIUM,**

Office, 99 CEDAR STREET, NEW YORK.

WORKS: Holcomb Rock, Va.; Kanawha Falls, W. Va.

Business
Established, 1826.

ALAN WOOD COMPANY,

Incorporated
1886.

**Manufacturers of Sheets and Light Plates of Iron and Steel,
BLACK AND GALVANIZED.**

General Office and Warehouse,
519 Arch Street, Phila.

Schuylkill Iron Works,
Conshohocken, Penna.

SPECIALTIES.—Patent Planished Locomotive Jacket, Corrugated, Bath Boiler, Gas Holder, Swede and Norway Sheets, Blue Annealed, Best Bloom, M. F., A. W. Clean, Cold Rolled Sheets, Pickled and Cold Rolled Sheets, Best Last, Water Pipe and Light Plates, Electrical Iron and Steel.

The only manufacturers of Sheets having a warehouse in Philadelphia, where we invite the trade and consumers to inspect our large and well-assorted stock.

**A. MILNE & CO.,
SWEDISH (NORWAY) IRON AND STEEL.**

Blooms, Billets, Bars; Wire, Rivet and Nail Rods.

FOREIGN and DOMESTIC IRON and STEEL.
1 Broadway, New York. 8 Oliver Street, Boston.

HORACE T. POTTS & CO.,

—IMPORTERS OF—

NORWAY (SWEDISH) IRON.

ALL REGULAR SIZES IN STOCK.

Special sizes ROLLED or HAMMERED to order

AMERICAN IRON AND STEEL OF ALL DESCRIPTIONS IN STOCK

316, 318, 320 North Third Street, - Philadelphia, Pa.

L. & R. WISTER & CO.,

672 BULLITT BUILDING, PHILADELPHIA PA

—SALES AGENTS FOR—

AMERICAN SHEET IRON CO.

Manufacturers of **BLACK SHEET IRON** in gauge from 17 to 28.

WORKS AT PHILLIPSBURG, N. J. CORRESPONDENCE SOLICITED

HOOPS and BANDS,
BAR IRON and STEEL,
BLUE ANNEALED
and GALVAN-
IZED SHEETS
WROUGHT
IRON
PIPE.

JOHN B. NEWKIRK & CO.,
Manufacturers and Exporters of
IRON-STEEL-COAL CO.,

RAILWAY AND MINE SUPPLIES A SPECIALTY
CORRESPONDENCE SOLICITED.

STRUCTURAL SHAPES,
STEEL CASTINGS,
STEEL PLATES,
STEEL RAILS,
IRON and
STEEL
FORG-
ING

—OFFICES—

HARRISON BUILDING, 15th and Market Sts., PHILADELPHIA, PA., U. S. A.

CONSOLIDATED IRON & STEEL CO.,

MANUFACTURERS OF

Refined Bars, Rods, Band and Hoop Iron.

Rolling Mill at BRISTOL, PA.

Office—864 BULLITT BUILDING, PHILADELPHIA.

GEO. NASH & CO.,

SPECIALTIES IN HIGH GRADE STEEL

COLD ROLLED STRIP STEEL

FOR BLANKING AND DEEP DRAWING.

USED IN BICYCLE PARTS, SEWING MACHINE ATTACHMENTS, ETC.

DRILL RODS,
MUSIC WIRE,
SPRING WIRE,

COLD ROLLED STEEL

TO TEMPER FOR

SAWS, SPRINGS, ETC.

HARDENED AND TEMPERED

STEEL STRIPS AND

WIRE, ETC., ETC.

DANNEMORA" TOOL AND SELF-HARDENING STEELS

Manufactured by SEEBOM & DIECKSTAHL, Sheffield, Eng.

NEW YORK,
15 PLATT STREET.

CHICAGO,
24 SO. CLINTON ST

- R. MUSHET'S -
"SPECIAL," **STEEL** "TITANIC,"
FOR
LATHE AND PLANNER TOOLS.

(The "Trade-Marks" of which are registered in the United States.)

MANUFACTURED ONLY BY

SAMUEL OSBORN & CO., - - Clyde Steel and Iron Works, Sheffield, Eng.

SOLE REPRESENTATIVES IN THE UNITED STATES.

B. M. JONES & CO., - - No. 81 Milk St., Boston.
NO. 143 LIBERTY STREET, NEW YORK

CABEEN & CO.,

Real Estate Trust Building, PHILADELPHIA.
Steel Billets and Slabs, both Bessemer and Open Hearth,
Pig Iron, Manufactured Steel, &c.

ESTABLISHED 1869.

JEROME KEELEY & CO.,

The Philadelphia Bank Bldg., 421 Chestnut St.,
PHILADELPHIA.

**Foundry and Forge Pig Irons,
Iron Ores, Coke, Coal.**

**Steel Blooms, Billets, Rails, etc.
Muck Bars, Blooms, Scrap Iron.**

Consulting Engineers in Metallurgy and Mining.

J. Wesley Pullman,

238 South Third Street, PHILADELPHIA.

Best American and Foreign IRON ORES

Neutral Pig Irons.

FRANCIS WISTER,
COMMISSION MERCHANT.

Coke, Coal, Ores.

Agent for **BLAIR RUN COAL CO.** and
South Angeline Ore.

Blair Run Coal is especially adapted for Rolling
Mill Use.

1437 Chestnut St. Entrance 41 So. 15th St., Phila.

O. B. Houston. J. Max Bernard. H. H. Houston.

C. B. HOUSTON & CO.,
Girard Building, PHILADELPHIA.

**Pig Iron, Coal, Coke, Steel Rails, Struc-
tural Iron, Steel Castings and Fire Brick.**

Sole Agents for Paxton Rolling Mills.

STEEL AND IRON PLATES.

J. J. MOHR.

Bullitt Building, No. 131 South Fourth St.,
PHILADELPHIA, PA.

**Foundry, Forge, Charcoal and Bes-
semer Pig Iron.**

Dealer in Scrap, Old Car Wheels, Muck
Bars and Connellville Coke.

ERNEST LAW & CO.,

(Successors to J. W. HOFFMAN & CO.)

Harrison Bldg., 15th and Market Sts., PHILADA.

**Iron and Steel, Coal and Coke,
PIG IRON AND ORES.**

Iron and Steel Plates, Sheets, Bars and Shapes.
Rails. Cars and Locomotives.
Track Equipment.

CORRESPONDENCE SOLICITED.

Justice Cox, Jr., & Co., Ltd.,

552 & 554 Bullitt Building, Phila., Pa.

IRON and STEEL.

—AGENTS FOR—

Canonsburg Iron & Steel Co.'s Superior Light Steel Sheets,

Lebanon Rolling Mills Co.'s Plates and Bars.

Brier Hill Iron & Coal Co.'s Bessemer and Low Phos. Pig Iron,

Pulaski Iron Co.'s High Grade Foundry and Forge Pig Iron.

Lebanon Valley Furnace Co.'s Cornwall Bessemer Pig Iron.

National Structural Tubing Co.'s Tubing and Shapes.

Bars, Angles, Sheets, Tank and Bridge

Plate, Muck Bars, Scrap Iron and

Steel, New and Old Rails,
Foreign and Domestic Ores.

W. H. THOMSON & CO.

**IRON AND STEEL. COAL AND COKE,
STEAMSHIP OUTFITS,
RAILWAY EQUIPMENT.**

Room 511-512 Land Title Bldg.,
Broad and Chestnut Sts.,
PHILADELPHIA, PA.

Eastern Agents, Youngstown Iron and Steel Roofing
Co., Youngstown, O.

J. TATNALL LEA & CO.,

STEPHEN GIRARD BUILDING,

NO. 19 SO. 12TH ST., PHILADELPHIA.

**Bessemer, Mill and Foun-
dry Pig Iron, Steel Bil-
lets, Muck Bars and
Iron Ores.**

ESTABLISHED 1848.

SINGER, NIMICK & CO.,

PITTSBURGH, PA.

(INCORPORATED.)
— MANUFACTURERS OF ALL KINDS OF —

Hammered and Rolled

STEEL.Cold Rolled Strip Steel.
Cold Drawn Bar Steel,

Crucible Tool, Saw, File and Sheet Cast Steel.

Crucible and Open Hearth Agricultural Steel. Rolling Plow Colters. Harrow Discs.

Also Carriage and Wagon Springs and Axles.

SINGER, NIMICK & CO., Inepd., 55, 57 and 59 North Jefferson St., Chicago, Ill.

Represented at 243 Pearl and 18 Cliff Streets, New York, by

HOGAN & SON, General Agents for Eastern and New England States.

GEORGE M. HOGAN, 417 Commerce St., Philadelphia; FITZ, DANA & CO., 110 North St., Boston.

LA BELLE STEEL CO.,

Ridge Avenue and Belmont Street, Allegheny City, Pa. Post Office Address, Pittsburgh, Pa.

MANUFACTURERS OF ALL KINDS OF **STEEL** SPRINGS, AXLES, RAKE TEETH, Etc.**WETHERELL BROS.** Eastern Representatives. 31 Oliver St., Boston, Mass., and 120 Liberty St., New York City.Chicago Agent, **BYRON H. WHITE**, 68-70 South Canal St., Chicago.Canadian Agent, **W. C. BLYTH**, No. 76 York St., Toronto Ont.**THE LORAIN STEEL CO.**
Rails & Billets. LORAIN O.**THOMAS W. FITCH, Pres.****THOMAS W. FITCH, Jr., Sec'y and Treas.****PITTSBURGH STEEL SHAFTING COMPANY,**

Offices: 1212-1214 Park Building, - - PITTSBURGH, PA.

Turned, Rolled and Polished

STEEL SHAFTING

AND SQUARE AND HEXAGON BARS.

Eastern Office, POSTAL TELEGRAPH BUILDING, 253 Broadway, NEW YORK.

N. LILIENBERG,
150 BROADWAY, N. Y.**SWEDISH IRON & STEEL**All grades from the famous
DAENEMORE WORKS OSTERBY, IGGESUND,
SÖDERFORS and others.**REED F. BLAIR & CO.,**
Lewis Building, Pittsburg, Pa.**STEEL BUILDINGS**

Of Every Description.

IRON CASTINGS.

Heavy Work A Specialty.

TUBING WORKS ESTABLISHED IN 1883.

SMALL SEAMLESS BRASS
AND COPPER**TUBING.**

1-32 to 3/8 inch in diameter— any Gauge.

SEND FOR QUOTATIONS.

WM. S. SPOFFORD & SON,
Providence, R. I., U. S. A.**STEAM
HAMMERS**

DOUBLE STAND.

Made Especially for Hammering
TOOL STEEL.

Sizes from 400 to 3,000 Pounds.

Fitted with our Improved Piston Valve.

Samuel Trethewey & Co., Ltd.,

PITTSBURGH, PA.

ESTABLISHED 1865 INCORPORATED 1883
CRESCENT STEEL.
NEW-YORK • CHICAGO • DENVER
400 PEARL ST. 54 & 56 S. CLINTON ST. 325-1127 WAZEE ST.PLANTS FOR THE ECONOMICAL PRODUCTION OF
**BRASS AND COPPER SHEETS,
RODS, WIRE and TUBING.**

Preliminary Expert Work and Complete Plants.

HUGH L. THOMPSON, Engineer,

WATERBURY, - - - - - CONN., U. S. A.

**CANTON STEEL CO.,**ESTABLISHED
1872.

MANUFACTURERS OF

TOOL STEEL

AND OTHER GRADES OF

FINE CAST STEEL.

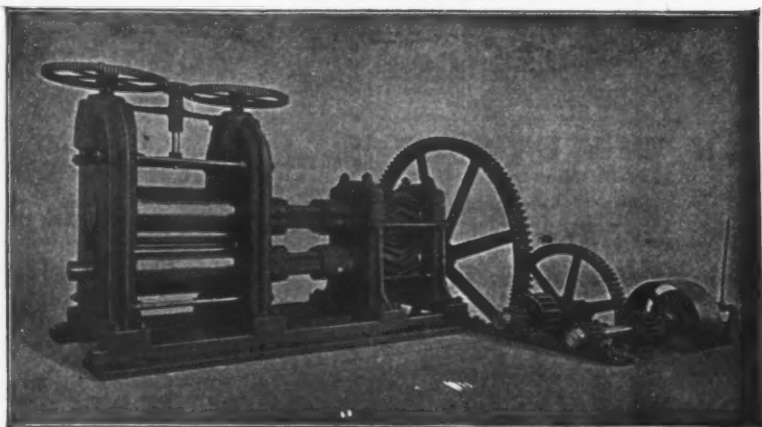
CANTON, OHIO.

FARREL FOUNDRY & MACHINE CO.,**ANSONIA, CONN.**

BUILDERS OF

Heavy Machinery.

MAKERS OF

Heavy Castings,**of IRON, or SEMI-STEEL
in Dry Sand, Green Sand
or Loam.**Please specify your inquiry and mention **THE IRON AGE.**

CHILLED and SAND ROLLS. ROLLING MILL MACHINERY for Brass, Copper, Lead, Silver, Britannia and other metals. TRANSMISSION MACHINERY. RUBBER MACHINERY. MINING MACHINERY. Stone Breakers, Crushing Rolls, etc. STONE WORKING MACHINERY. Planers, Headers, Diamond Saws, etc. MACHINE MOULDED GEARING. GENERAL MACHINERY, Felt Hardeners, Veneer Cutters, Shears, Hydraulic Presses and Pumps, Railroad Cranes, etc., etc.

VULCAN FOUNDRY AND MACHINE CO.,**NEW CASTLE, PA.****SQUARING
DOUBLING
BAR****SHEARS****DRAW BENCHES****MILL CASTINGS**

AND OTHER SPECIALTIES.

OF ALL DESCRIPTIONS.

OTIS STEEL

"OTIS" FIRE-BOX PLATES A SPECIALTY.

FLANGE PLATES, SHIP PLATES, TANK PLATES.

STEEL AXLES of all kinds,

STEEL CASTINGS AND FORGINGS.*Head Office and Works, CLEVELAND, OHIO.*

Agencies: NEW YORK, 97 Cedar Street. ST. LOUIS, 615 N. Fourth St.

WASHINGTON, Kellogg Building.

MONTREAL, Homer Taylor, 183 St. James St.

SAN FRANCISCO, John Woodlock, 154-156 First Street.

**STEEL
CASTINGS**FROM 1 to 40,000 POUNDS WEIGHT.
Of Open Hearth or McHaffie Steel.*True to Pattern. Sound. Solid.*

Gearing of all kinds, Crank Shafts, Knuckles for Car Couplers,

Cross-Heads, Rockers, Pistons Heads, etc., for Locomotives.

Steel Castings of Every Description.

CHESTER STEEL CASTINGS CO.,
Works, Chester, Pa. Office, 407 Library St., Philadelphia, Pa.

TRADE-MARK.

**BRAEBURN STEEL COMPANY,
BRAEBURN, PA.**

Manufacturers of

Fine Tool Steel and Forgings. Also Spring,
Hammer, and Machinery Steel of high
quality. Fine Open Hearth Steel

DIRECTORS:
William Metcalf,
Charles Metcalf,
P. B. Hasbrouck,
R. P. Kelly,
Sec'y and Treas.

**THE LIMA
STEEL CASTINGS**

COMPANY, LIMA, O., U. S. A.

Open Hearth Steel Castings of Every Description.
Send Specifications for Prices.**Steel
Castings**

From 1 oz. to 60,000 lbs.

TRUE TO PATTERN.

H. M. SHAW,

935A Banigan Building,

PROVIDENCE, R. I.

THE ARTHUR C. HARVEY CO.,
BOSTON, MASS.
Importers and Dealers.
**Norway and Swedish
IRON.**

Full assortment of Iron and Steel in Boston.
Warehouse.

BARCLAY W. COTTON & CO.,
Successors to ESHERICK COTTON & CO.,

Iron and Steel Merchants.

AGENTS FOR
"CONTINENTAL" CORRUGATED FURNACES.
418 Walnut St., PHILA.

L. & R. WISTER & CO.
672 Ballitt Building,
Philadelphia.

Dunbar Foundry Forge and
Basic Pig Iron.
Wyebooke Cold Blast.

Dealers in all kinds of Scrap Iron and Steel.

HENRY LEVIS & CO.,
Manufacturers' Agents

For Iron and Steel Rails, Car Wheels, Boiler
and Sheet Iron and General
Railway Equipments,
Old Rails, Axles and Wheels bought and sold
26 S. 15th St., Philadelphia.

E. H. WILSON & CO.,
FIDELITY BUILDING,
112 North Broad St., Philadelphia.
BROKERS AND DEALERS IN

IRON AND STEEL.
Correspondence Solicited.

MIFFLIN WHEELER & CO.,

FORMERLY
Nicolls, Wheeler & Co.,
Fidelity Building, Philadelphia, Pa.
DEALERS IN

IRON and STEEL SCRAP,
Pig Iron, Muck Bars, Charcoal Blooms, &c., &c.
Steel and Iron Plates, New and Old Rails.

EDWARD J. ETTING,

Land Title Building, Philadelphia, Pa.

IRON, STEEL, PIG IRON.

AGENT FOR

Maryland Car Wheel Works, Car Wheels.

"Turner" Water Tube Safety Boilers.

"Mount Savage" Fire Brick.

"Primrose" Molding Machines for Iron and
Brass Foundries.

"Whiting" Cranes, Cupolas, Air Hoists and
other Foundry Equipment.

"Standard" Pneumatic Tools.

OGDEN & WALLACE,

677, 679, 681 and 688 GREENWICH ST.,

NEW YORK.

IRON and STEEL.

BARs, ANGLES, TEES, BEAMS, CHANNELS, PLATES
SHEETS, BANDS, HOOPS, ETC.

AGENTS FOR

THE FINISHED STEEL CO., Cold Finished
Steel Shafting, etc.

BRAEBURN STEEL CO., Tool Steel, etc.

C. R. Baird & Co

PIG IRON,

Philadelphia.

**Heavy Hydraulic Presses and
Machinery of Special Design.**

BETHLEHEM STEEL COMPANY,
South Bethlehem, Penna.

NEW YORK:
100 Broadway.

PHILADELPHIA:
421 Chestnut Street.

CHICAGO:
1433 Marquette Bldg.

THE LLOYD BOOTH CO.,
YOUNGSTOWN, O.



HYDRAULIC MACHINERY—MILL TABLES.
IRON AND STEEL WORKS MACHINERY.

THE LORAIN FOUNDRY COMPANY,
LORAIN, OHIO.

SAND AND CHILLED ROLLS.

HEAVY IRON CASTINGS IN LOAM, DRY and GREEN SAND,
MADE FROM CUPOLA OR AIR FURNACE.

BRASS and COPPER CASTINGS.



GEO. MESTA, Pres't.

W. H. REA, Treas.

J. O. HORNING, Sec'y.

Mesta Machine Company,
Pittsburgh, Pa.,

SUCCESSORS TO

THE ROBINSON-REA MFG. CO., and
LEECHBURG FOUNDRY AND MACHINE CO.

MANUFACTURERS OF

**Rolling Mill, Steel Works and Tin Plate
Machinery, Machine-Molded Gears,
Ingot Molds, Chilled and Sand Rolls.**

ESTABLISHED 1870.



ROLLS

EXCLUSIVELY, FOR ALL PURPOSES.

AETNA & CORLISS ROLLING MILL ENGINES



PINIONS, CHILLED & SAND ROLLS.

ROLLING MILL & TIN PLATE MILL MACHINERY

THE PHILADELPHIA ROLL AND MACHINE CO.,

Makers of **HEAVY AIR FURNACE CASTINGS**, including

**GUN
CARRIAGES,
ROLLING
MILL
MACHINERY.**



**GAS
PRODUCERS
AND
FURNACES.**

We make a specialty of Plate Straightening Machines and are prepared to furnish

TIN PLATE MILLS.

23d St. and Washington Ave., - - - PHILADELPHIA, PA.

JOHN H. RICKETSON, Prest.

A. G. BARNETT, Treas.

W. L. RICKETSON, Supt.

O. G. RICKETSON, Vice-Prest

A. G. BARNETT, Jr., Sec'y

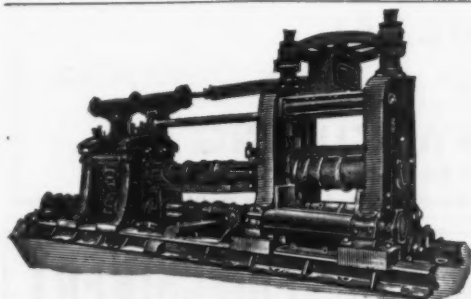
A. GARRISON FOUNDRY CO.,

Manufacturers of Sand, Patent Homogeneous Steel and

CHILLED ROLLS.

Ore and Clay Pulverizers, Rotary Squeezers, Haskin's Patent Double Spiral Pinions and Rolling Mill Castings of every description.

Office: South Ninth and Bingham Streets, PITTSBURGH, PA.



**Frank-Kneeland
Machine Co.,**

54th St., PITTSBURGH, PA.

**CHILLED, SAND
AND STEEL ROLLS**

Rolling Mill Machinery.

DIAMOND DRILL AND MACHINE COMPANY,
BIRDSBORO, PA.
**Rolling Mill, Hydraulic
and General Machinery**
LIGHT AND HEAVY IRON CASTINGS.

"Royal" Rock and Ore Crusher, Diamond Drill, Belt-Lacing Machines.

Sheet and Tin Mills

CHILLED AND SAND ROLLS.

Prompt Deliveries.

F. R. PHILLIPS & SONS CO.,

Philadelphia.

**PYROMETERS,
for
BLAST
and
ANNEALING
FURNACES.**

Guaranteed reliable, whether used constantly or intermittently.

UEHLING, STEINBART & CO., Ltd.,
Carlstadt, N. J.



Hundreds of testimonials showing these castings have proved the most satisfactory and economical for all purposes requiring strength and durability.

CHROME STEEL WORKS,
Kent Ave., Keap and Hooper Sts., Brooklyn, N. Y.

MALLEABLE CASTINGS,

Made from Refined Charcoal Iron.

DUCTILE STEEL,

Will not Harden in Brazing or Welding.

ACME STEEL,

Will Temper Like Tool Steel.

Suitable for Edge Tools, Scissors, Razors, etc.

ACME STEEL AND MALLEABLE IRON WORKS
Buffalo, N. Y.

**FOUNDRY
FACINGS.**

More of the Obermayer foundry facings are used in the Foundries of the United States than from all other supply houses combined.

Why?

Because operating the three largest plants in the world we not only give better goods but can make the lowest estimates. Write

THE
S. OBERMAYER CO.,
Cincinnati, O., Chicago, Ill.

WRITE FOR CAT. "C."

"Everything you need
in your Foundry."

PATENT TUMBLING BARRELS.

MANY VARIETIES.

For all Kinds of Work.

Send for New Catalogue.

HENDERSON BROS., WATERBURY, CONN.

Galvanizing and Tinning.

A Practical Treatise on Coating with Tin and Zinc, with a Special Chapter on Tinning Gray Iron Castings. By W. T. Flanders. Size 5½ x 8 inches. 93 pages, 40 illustrations. Cloth bound. Price \$2.00.

The author of this work has made a specialty of galvanizing and tinning, and has been employed to erect plants in various parts of the country, also to instruct the owners, so that, in all instances, they have been able to operate them successfully. The subject of galvanizing is, therefore, treated from the standpoint of an expert and in a practical manner. The selection of materials and apparatus for erecting plants of large and small capacity is treated, together with instructions for their equipment and accompanied by many illustrations of the plants and of the tools and appliances. Plain directions are given for the preparatory treatment of metals and articles to be coated, and every detail which is of importance in successfully applying to metals a secure and attractive coating is described. The tinning of articles is treated in the same practical manner. The difficulties found by many who have attempted to tin malleable and gray iron castings are explained and methods for doing the work made simple.

CONTENTS.

Galvanizing.

Locating a Plant and Selecting a Kettle.
The Galvanizing Room.
Tanks for Acids and Other Purposes.
Tools for Galvanizing.
Filling and Firing a New Kettle.
The Use of a Pyrometer.
Materials Used in Galvanizing.
Building and Setting Kettles.
Removing Scale with Sulphuric Acid.
Cleaning Sandy Castings with Sulphuric Acid.
Preparing the Work for Dipping in the Zincing Bath.
Drying the Work.
The Heat of Zinc.
Dipping the Work in the Molten Metal.
The Formation of Dross in the Kettle.
Running Over, or "Sweating," Zinc Dross.

Tinning Malleable Iron, Wrought Iron and Steel.

Preparing the Work.
Tools and Kettles.
A Tinning Plant.
Plan of Tinning Plant.
Removing Scale and Rust with Sulphuric Acid.
Cleaning Sandy Castings by Sulphuric Acid.
Cleaning Sandy Castings with Hydrofluoric Acid.
Removing Paint or Grease.
Tinning with a Single Kettle of Tin.
Tinning with Two or More Kettles of Tin.
Passing the Work Through the Tinning Kettles.
Tinning Wire in Colls.
Tinning Steel Spoons and Similar Articles.
Retinning.
Setting Retinning Kettles.

TINNING COMMON GRAY IRON.

Description of Tinning Plant.
General Considerations.
Tumbling Barrel.
Freeing Gray Iron Castings from Sand by Hydrofluoric Acid.
Cleaning Sandy Castings with Sulphuric Acid.
The Use of a Hot Alkali Bath in Certain Cases.
Preparing the Castings in the Gas Barrel.
Coating the Castings with Tin.

Sent postpaid on receipt of price, \$2.

DAVID WILLIAMS COMPANY,

Publishers,

232-238 William St., New York.

THE SESSIONS FOUNDRY CO.,

BRISTOL, CONNECTICUT.



Main foundry room 530 x 110 ft.

IRON CASTINGS. High Grade Castings, small and Large. To Order.

ESTABLISHED 1850.

**ARCADE
MALLEABLE
IRON CO.**

Malleable Iron

and Steel Castings.

Correspondence solicited. Prices given upon receipt of patterns or samples.

WORCESTER, MASS.

WARREN, McFARLAND & CO.

GEO. B. BUCKINGHAM.



FOR CASE-HARDENING,

CARBURIZER is the most efficient material.

It penetrates deeper, requires less time and is cheaper on account of its specific weight than any other material now in use.

CARBURIZER does not corrode the article and iron or steel does not become brittle if properly treated. *The Carbon projected into metal by our process is not lost if it be found necessary to reheat the hardened piece.*

CARBURIZER contains no obnoxious substances and is ready for immediate use.

For full particulars address

AMERICAN CARBURIZING CO.,

160 Pearl Street, NEW YORK.

Factory, Warren and Bay Streets, Jersey City, N. J.

MALLEABLE IRON

**SEMI-STEEL AND
GUN METAL**

Castings and Fittings of Every Description

**YORK MANUFACTURING CO.
YORK, PA.**

ROLLS.

Sand and Chilled Rolls, rough, necked or finished. McJoy patent combination mill pinions up to 3' inch. Machine molded and pattern gearing. Gear list sent on application.

CASTINGS.

Heavy castings of cast iron or semi steel. Made in dry sand, green sand or loam. Large modern foundry. Castings up to twenty tons in weight.

MACHINERY

Rolling Mill Machinery, Shears, Rubber Mill Machinery, Special Tools for Agricultural Implements, Hydraulic Presses, and all general heavy machinery to order.

BIRMINGHAM IRON FOUNDRY,

**DERBY,
CONN.,
U. S. A.**

NORWALK PATTERN & MFG. CO.,

CHAS. H. AISTHORPE.

SO. NORWALK, CONN.

N. HATCHMAN.

GRAY
IRON

CASTINGS—PATTERNS

WOOD,
IRON.

—SEND FOR ESTIMATES.—

M. D. VALENTINE & BRO CO.
FIRE BRICK
 CUPOLA LININGS A SPECIALTY.
WOODBRIDGE. N. J.

LIGHT GRAY IRON CASTINGS.

UNEQUALED IN SOFTNESS AND SUPERIOR FINISH.

On account of our immense facilities we can put patterns in sand on receipt of order.
 Send trial order. Prices are right.

STANDARD FDY. & MFG. CO., Cleveland, O.

THE FERRO-CARBON CASTINGS CO.,
 FRANKFORD, PHILADELPHIA, PA.

Pres't & Gen'l Manager, ALFRED G. REX, Vice-Pres't, J. K. CALDWELL, C. A. G. RIEGE, Sec. & Treas.

GEAR WHEELS,

CAR WHEELS,

CYLINDERS,

VALVES and

FITTINGS,

AGRICULTURAL,

ARCHITECTURAL

and HYDRAULIC

CASTINGS.

Founders of High Grade Castings of Atlas Metal and Manufacturers of Superior Edge Tools and Tool Steel of Atlas Metal.

First Class Castings of this Metal, of any Weight, Size or Thickness, of Uniform Structure and Properties Throughout.

Information and estimates on application.

Sample order solicited.

THE ALLENTOWN ROLLING MILLS, Telephone No. 1731.
 ALLENTOWN, PA.

Blast Furnaces, Rolling Mills, Foundry and Machine Shops.

Manufacturers of General Machine Shop and Foundry Work.

Structural Iron Work, Highway Bridges, Castings, Etc. Railroad Switches, Frogs, Crossings, Etc. Railroad Signals and Interlocking Apparatus for Steam and Trolley Roads.

SCOTT DIBERT, Pres.
 T. O. DUPONT, Vice Pres.

HENRY Y. HAWS, Gen. Mgr.
 JOHN H. WATERS, Secy.-Treas.

INCORPORATED 1899.

W. H. HAWS FIRE BRICK CO.,

MANUFACTURERS OF

HIGH GRADE SILICA BRICK.

Special Shapes Made to Order.

Annual Capacity,
 15,000,000.

Office and Works,
 MT. UNION, Huntingdon Co., Pa.

Pittsburg Agent, W. H. HILL, 404 Park Building.

SOLID STEEL CASTINGS.

NEW ENGLAND STEEL CASTINGS CO.,

403 PROVIDENT BUILDING, PHILADELPHIA, PA.

DIAMOND THIMBLES.

S. CHENEY & SON. Manlius, N. Y.

B

CYRUS BORGNER CO.
 SUCCESSORS TO CYRUS BORGNER
 239 ST. ABOVE RACE PHILADELPHIA, PA. U.S.A.
FIRE BRICK
 AND
CLAY RETORTS

ESTABLISHED 1854.

HENRY MAURER & SON,

MANUFACTURERS OF

FIRE BRICK

of all Shapes and Sizes.

420 E. 23d St., New York.

Send for Illustrated Catalogue.

ESTABLISHED 1844.

GARDNER BROS., James Gardner & Son.

Manufacturers of "Standard Savage"

Fire Brick for all Purposes.

Office, CUMBERLAND, MD., P. O. Box 240.
 Agents: B. Wallace & Co., Baltimore, Md. Cleveland
 Builders' Supply Co., Cleveland, O. E. E. Melick,
 Croser Building, Philadelphia.

Established 1848.

Ostrander Fire Brick Company

MANUFACTURE FIRE BRICK FOR ALL PURPOSES.

Works at TROY, N. Y., and OSTRANDER, N. J.

Main Office, TROY, N. Y., to which correspondence should be addressed.

PRESBRY

FIRE BRICK WORKS,

TAUNTON, MASS.

The Best Quality

FIRE BRICK

For IRON or BRASS FOUNDRIES and ALL FURNACES.

Send for Catalogue.

**MARINE,
 MACHINE,
 RAILROAD
 And SHAFT**

FORGINGS

Up to 30 in. Diam. or
 15 Tons Weight.

FULLY FINISHED WORK A
 SPECIALTY.

Write us for prices.

EASTERN FORGE CO.

OF MASS.,

72 Kilby Street,

BOSTON, - - MASS.

Works, NASHUA, N. H.

TILGHMAN'S PATENT

SAND BLAST MACHINERY,

For removing the scale from castings and
 metals of all kinds. Send for Catalogue.

EDGAR T. WARD & SONS, Boston.

GEO. NASH & CO., Chicago.

**COMPLETE PLANTS
DESIGNED AND
ERECTED WITH
GUARANTEED RESULTS.**

**BILLET AND SLAB CONVEYORS,
BAR IRON CONVEYORS,
MECHANICAL BOSHES.**

Labor Saving Devices and Conveying Machinery of All Kinds.

HEYL & PATTERSON, - - - Pittsburgh, Pa.

CHAIN

WE MAKE COIL CHAIN.

**JAMES H. BAKER MFG. CO.,
PITTSBURG, PA.**

**DO YOU WANT TO KNOW ABOUT
CHAINS AND CHAIN MAKING?**
If so, send us a post card and if from the
number received we think the interest
sufficient, we will occupy our space in
close print with a concise history of chain
making.

We have excellent
facilities for
producing
LIGHT GRAY IRON

CASTINGS

promptly and in any
quantity. Work pol-
ished, nickel-plated
or japanned.

CODLING MFG. CO., Bristol, Conn.

Chicago Drop Forge & Fdry. Co.

WORKS ESTABLISHED 1880

DROP

FORGINGS

Of All Kinds.

KENSINGTON, ILLS.

38 minutes South of Chicago
by Ills. Central R. R. Suburban trains.

**SUBWAY. IRON CASTINGS. MILL.
STRUCTURAL. MACHINERY.
Wheeling Mold and Foundry Co.,
Estimates Furnished Promptly. Wheeling, W. Va. PITTSBURG OFFICE,
107 WOOD ST.**

FINE GRAY IRON CASTINGS.

True as a die to every outline of the pattern.

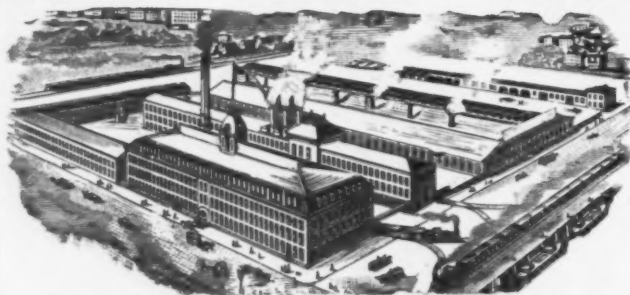
High Grade Brass and Bronze Castings.

PRICES RIGHT.

G. S. SPENCER'S SONS,

GUILFORD, CONN.

GRAY IRON CASTINGS



**TIN PLATED,
Japanned,
Nickel Plated,
Etc.**

**ALBANY . .
FOUNDRY CO.,
ALBANY, N. Y.**

**Iron and Steel
HEAVY FORGINGS
OF EVERY DESCRIPTION.
TITUSVILLE FORGE CO.
TITUSVILLE, PA.**

**CHARCOAL-IRON
BOILER PLATES.**

The same as we have been making for
the last thirty years.

**THE SEIDEL & HASTINGS CO.,
Wilmington, Delaware.**

GRAY IRON CASTINGS.

FINE, CLEAN AND SOFT. SATISFACTION GUARANTEED.
WM. M. CRANE CO. 1131 and 1133 Broadway, N. Y. City. Foundry, Peekskill, N. Y.

Consolidated Railway Electric Lighting & Equipment Co.

DROP FORGINGS

For Tools, Steam Pumps, Machine Parts, Printing Presses, Agricultural Implements, Automobiles, Carriages and Bicycles.

The "Axle Light" system of Electric Lights and Fans for Passenger Cars.

The Lindstrom Lever Brake for Steam Railway Cars.

General Offices: 100 Broadway, New York.

J. L. WATSON,
Secretary and Treasurer.

JNO. T. DICKINSON,
Gen'l Agent.

JNO. N. ABBOTT,
Vice-Prest. and Gen'l Mgr.

JAMES L. TAYLOR,
Third Vice-Prest.

F. W. BENHAM, Manager, Drop Forge Department.

FACTORY.

DERBY, CONNECTICUT.

PAGE-STORMS

DROP FORGE CO.,

CHICOPEE FALLS, MASS., U. S. A.

DROP FORGINGS

OF EVERY DESCRIPTION.

SEND FOR ESTIMATES.

SMALL STEEL CASTINGS

THAT ARE MOULDED TRUE TO PATTERN.
THAT ARE OF TOUGH AND UNIFORM METAL.
THAT ARE EASILY MACHINED (NO HARD SPOTS).
THAT ARE FREE FROM BLOW OR SAND HOLES.
THAT WILL TAKE A FINE POLISH.
THAT WILL HARDEN LIKE TOOL STEEL.

SEND SAMPLES FOR PRICES, STATING QUANTITY REQUIRED.

HOMER F. LIVERMORE,

85 and 87 PEARL ST. BOSTON, MASS.

HEAVY MACHINERY

BUILT TO ORDER.

Capacity up to 20,000 lbs. in single piece and 16 ft. in diameter.

CRUCIBLE AND OPEN HEARTH
STEEL CASTINGS,
1/4 lb. to 3000 lbs.

SPECIAL MACHINERY,
HYDRAULIC MACHINERY,
HIGH SPEED MACHINERY,

IRON and STEEL FORGINGS.

PIPE CUTTING MACHINES,
IMPROVED RAIL BENDERS.
Accuracy, Prompt Delivery.

P. HOLLINGSWORTH MORRIS, 1501 So. Front St., Philadelphia, Pa.

FORGINGS

RAILROAD and
SPECIAL FORGINGS.

Telephone
Forgings,
Lag Screws,
Air Brake Pins.

FORGINGS

BOLTS
and
RIVETS.

**Vulcanus
Forging Company,**
CLEVELAND, O.

FORGINGS

We keep a full line of Standard Air Brake Forgings in stock.

R. D. WOOD & CO.,

Engineers, Iron Founders, Machinists,

100 Chestnut St., PHILADELPHIA, PA.

Foundries and Works:

MILLVILLE, N. J. FLORENCE, N. J.
CAMDEN, N. J.

CONSTRUCTORS OF

Gas and Water Works.

MANUFACTURE EVERY
DESCRIPTION OF

CAST IRON PIPE.

MATHEW'S

FIRE

HYDRANTS,

SINGLE AND DOUBLE VALVE.

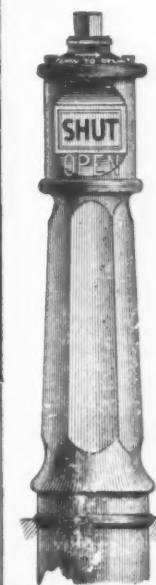
GATE VALVES,

INDICATOR POSTS.

SOLE MAKERS OF THE

Taylor Revolving Bot-
tom Gas Producer,

Water Power Pumps, Turbines, &c.,
&c. Engine Gas Plants.



VALVE INDICATOR
POST.

CAPE ANN TOOL CO.,

715 Granite Street,

PIGEON COVE, MASS., U. S. A.

DROP FORGINGS

OF EVERY DESCRIPTION.

Send for Estimates.

Evidence.

"Mulrooney," said the judge sternly, "do you plead guilty or not guilty?"

Mulrooney: "O! think o'it wait till o! hear the evidence."

We can furnish sufficient evidence to fill a cupola. All to the effect that our Foundry Supplies, Fire Brick, Coke, etc., which we have shipped are first class and cheapest in the market.

POINIER & LESTER,
204 Water St., Toledo, O.

UNITED STATES STEEL CO.,
MANUFACTURERS OF
JUPITER STEEL CASTINGS,
145-147 Oliver St., BOSTON, MASS.
Works at West Everett, Mass.

FORGINGS **Indianapolis Drop Forging Co.,**
 SEND SPECIFICATIONS FOR PRICE. **INDIANAPOLIS, IND.**

We have excellent facilities for producing
High Grade

CASTINGS

Malleable Iron
 promptly and in any quantity. Send us your specifications.

COLUMBUS MALLEABLE & GRAY IRON CASTINGS CO., Columbus, Ohio.

THE
Mechanical Engineering
 OF
Power Plants.

BY
FREDERIC REMSEN HUTTON, E.M., Ph.D.,
*Professor of Mechanical Engineering in the
 School of Engineering of Columbia University.*

HEADINGS OF CHAPTERS:

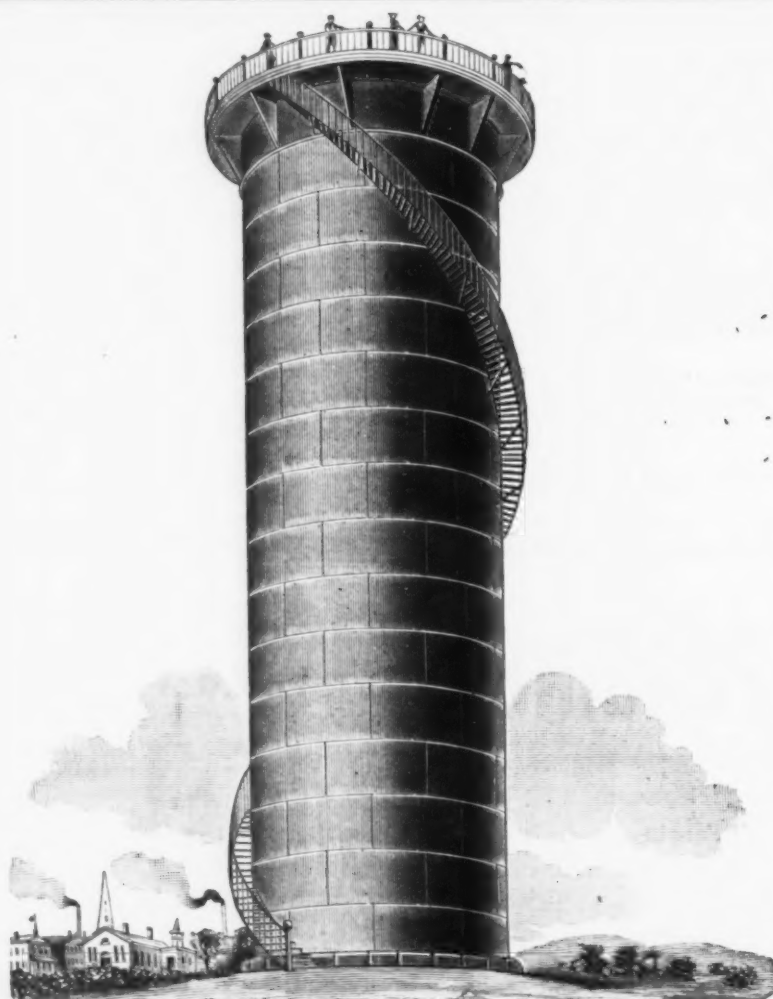
Introductory.
 The Mechanism of Engines.
 Engines Classified by Use of Steam.
 Condensing and Non-condensing Engines.
 Simple and Continuous-expansion Engines.
 Sundry Classifications. Control of Energy.
 Valves and Valve-gearing.
 Cam and Release Valve-gears.
 Reversing Valve-gears. Link Motions.
 Variable Cut-off Valve-gear.
 Governors for Steam-engines.
 Engine Foundations and Bed-plates.
 Cylinder, Piston, and Piston-rod.
 Cross-head, Guides, Connecting-rod.
 Crank, Shaft, Eccentric, Fly-wheel.
 Piping for the Engine and its Attachments.
 The Steam-boiler. General Construction.
 Types of Boilers:
 Externally-fired Shell Boilers.
 Externally-fired Sectional Boilers.
 Internally-fired Shell Boilers.
 Internally-fired Sectional Boilers.
 Boiler-settings.
 The Boiler-furnace as the Origin of Power.
 Boiler Accessories and Appliances.
 Care and Management of Boilers.
 Boiler Inspection and Testing. Boiler-explosions.
 Management and Running of Engines.
 Testing of the Power Plant for Efficiency.
 General Remarks upon the Power Plant.

8vo. Cloth. \$5.00.

750 pages and 500 illustrations.

Sent, post-paid, on receipt of price by

DAVID WILLIAMS CO.,
 Publishers and Booksellers,
 232-238 William St., New York.



W. W. LINDSAY & CO.,
ENGINEERS AND CONSTRUCTORS,
HARRISON BUILDING, PHILADELPHIA.

PENNSYLVANIA ENGINEERING WORKS,

OFFICES and WORKS, S. Jefferson St., NEW CASTLE, PA.

Blast Furnace and Steel Plant Construction, General Machine and Plate Work, Ingot-Moulds, Heavy Castings.

We build Pig, Hot Metal and Slag Cars, Charging Buggies, Large Ladles for Open-Hearth and Bessemer Plants, and Hydraulic Machinery.

We are specially equipped to build Heavy Shell Work, and solicit your inquiries.

M. M. COCHRAN, President.

W. HARRY BROWN, Vice-Pres.

JOHN H. WURTZ, Sec'y & Treas.

J. S. NEWMYER, Manager.

WASHINGTON COAL & COKE CO.

5,000 Acres of Coal.

5,000 Tons Daily Capacity.

350 Individual Coal and Coke Cars.

YOUGHIOGHENY COAL

For Steel Works, Rolling Mills, Tin Plate Works, Locomotive Fuel, etc.

COKING COAL

For Bee-Hive or By-Product Ovens.

Our WASHINGTON COKE

Is unsurpassed for uniform purity and general satisfaction in Blast Furnace and Cupola Practice.

General Office,

Sales Office, Pittsburg, Pa.

DAWSON, FAYETTE CO., PA.

N. P. HYNDMAN, Sales Agent.

BESSEMER COKE COMPANY, MANUFACTURERS OF CONNELLVILLE COKE

FURNACE, FOUNDRY AND CRUSHED COKE.

Mines and Ovens in Connellsville Region.

Offices, Lewis Block.

P. R. R., B. & O. R. R., and P. & L. E. R. R. Connections.

PITTSBURGH, PA.

CAPACITY, 75 CARS DAILY. INDIVIDUAL CARS.

JULIAN KENNEDY, Engineer.

Pittsburg, Pa., U. S. A.

**MACHINERY AND PLANT FOR THE
ECONOMICAL PRODUCTION
OF IRON AND STEEL.**

Consultations and expert work in
GENERAL ENGINEERING PRACTICE.

Cable address, "ENGINEER PITTSBURG."

DROP FORGINGS

THE BELDEN MACHINE CO.,

Whalley Ave. and Tryon St.,

NEW HAVEN, CONN.

Drop Forging in all its branches. Special attention given to Automobile, Locomobile and all Electrical work. Estimates given from blue prints or models. Correspondence solicited.

5 TO 25,000
POUNDS.

For ROLLING MILLS,
GLASS WORKS, ETC.,
And all purposes
requiring a
first-class product.

GREY IRON CASTINGS.

THE NEW ALBANY MFG. CO.
New Albany, Ind.

Which we are in
position to supply
promptly and at
prices that it will
pay you to investi-
gate. Send us your
specifications for an
estimate.

STEEL CASTINGS.

UNION STEEL CASTING COMPANY.

61st St., Pittsburgh, Pa.

Chemicals and
Chemical Apparatus
FOR

**Steel and Iron Analysis,
CALORIMETERS,
PYROMETERS,
BALANCES.**

Complete Laboratory Outfits.

EIMER & AMEND, NEW YORK.

E. R. ALLEN

MANUFACTURER OF

All kinds of soft, fine, medium and heavy
Grey Iron Castings to order. Boiler,
Heater, and Architectural Iron Castings
a specialty.

Send for Prices and Estimates.

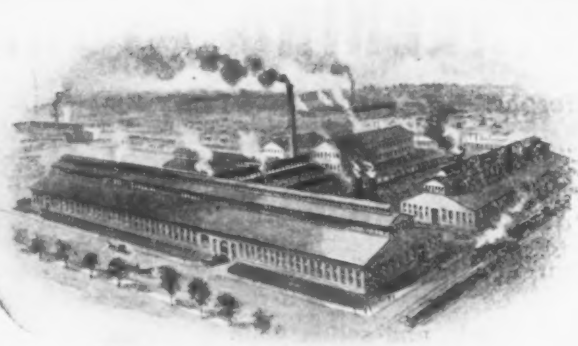
Corning, New York.

DROP FORGINGS

THE KILBORN & BISHOP CO.

65-61 Lloyd Street.

NEW HAVEN, - CONN.



JOHN E. DU BOIS, Proprietor.

Du Bois Iron Works

GENERAL MACHINE SHOP AND FOUNDRY

... Manufacturers of ...

Tubular Boiler, Mining, Tannery, Saw-Mill Machinery and Gray Iron Castings.

... Contractors ...

Structural Iron, Sheet Iron Tanks, Hoppers and Conveying Machinery.

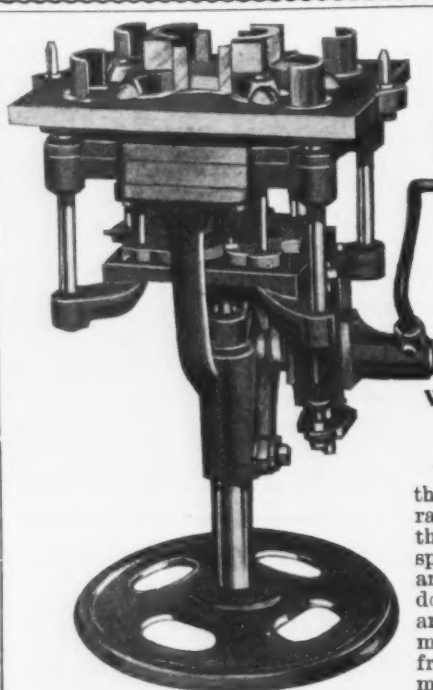
DU BOIS, PA.

Address all communications to DU BOIS IRON WORKS.
F. G. LAUER, General Manager.

Book Notes

Modern Foundry Practice.—The latest addition to the works on foundry practice is an English volume of this title by John Sharp, Whitworth Scholar, engineering and foundry manager, member of the Institution of Engineers and Shipbuilders in Scotland, &c. The processes of green sand, dry sand and loam molding and the materials used are dealt with extensively, machinery and other appliances employed being described in detail. In the preparation of this treatise the author employed portions of Spretson's "Casting and Founding," which was out of print several years ago, making essential revisions. The present work purports to cover the subject in the simplest manner possible while going into it more fully than any of the current books. The application of natural science to the art of founding is considered, chemical reactions and the various hydrostatic and mechanical principles involved in foundry practice receiving attention, and such calculations as will enable the molder to observe and avoid the causes of failure to produce sound castings. General cupola practice is extensively treated. A section of 28 pages is given to the cost of molding and casting, which attempts to generalize the various charges representing the cost of production, under ordinary conditions. Chapters are devoted respectively to Pig Iron—Its Characteristics and Mixtures; Points to be Observed in Designing Castings with Especial Reference to the Crystalline Formation of Metals; Fuel Furnaces for Remelting; Fonderie à Calabasse; The Reverberatory or Air Furnace; Maximum Temperatures, Measures of Heat; Thermometers and Pyrometers; Refractory Materials; Crucibles; Blast, Blowing Engines, Fans and Blowers; Patterns; Materials Used in Molding; Green Sand, Dry Sand and Loam Molding; Plate Molding and Molding Machines; Molding the Teeth of Wheels; Chill Casting; Malleable Cast Iron—Case Hardening; Casting on to Other Metals; Drying Stoves; Foundry Pits; Foundry Ladles; Foundry Cranes; Cast Steel; Brass Foundry; Bronze Fine Art Work; Statue Founding; Bell Founding; Cleaning and dressing Castings; Examples of Foundries; Cost of Molding and Casting; Alloys. The concluding chapter consists of a collection of useful tables and notes. 759 pages, 272 illustrations. Size, 6 x 9 inches. Cloth bound.....\$8.00

All Books prepaid at published prices.
DAVID WILLIAMS COMPANY
232-234 WILLIAM ST., NEW YORK.



MAYWOOD SAND RAMMERS and MOLDING MACHINES.

The increase over hand molding, the superior quality of castings, freedom from swells, uniformity, saving in chipping, fitting and machine work enable our machines to pay for themselves in sixty to ninety days.

WRITE FOR CATALOGUE.

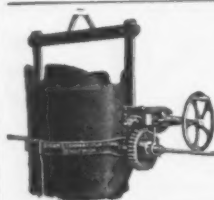
WARNING.

We hereby notify the trade that all double ended reversible rammers are an infringement of the Maywood Rammers. Prospective buyers of sand rammers are hereby notified that all double ended reversible rammers are an infringement of the Maywood Rammers, and according to law the user of an infringed article is equally liable with the manufacturer of same.



MAYWOOD FOUNDRY & MACHINE CO., 505-507 Monadnock Block, Chicago, Ill., U. S. A.

AGENCIES:—New England, A. P. Emmons, 630 Atlantic Ave., Boston, Mass. England, C. W. Burton, Griffiths & Co., Ludgate Square, London, E. C. Germany, Franz Küster, 9 Kaiserstrasse, Dresden.



FOUNDRY LADLES

ALL SIZES, FROM
35 POUNDS TO 35,000 POUNDS CAPACITY

BYRAM & COMPANY,
FOUNDRY OUTFITTERS,
DETROIT MICH. U. S. A.

THE
COLLIERIAL
FURNACE

Smoke Stacks Tanks &c. SHIP QUICK.

Lowest Prices.
Either erected or f. o. b. N. Y.

OLNEY & WARRIN,
36 Dey St., N. Y.



Tropenas Department. SMALL STEEL CASTINGS

TO REPLACE DROP FORGINGS.
Capacity, - - 50 Tons Daily.
Accurate work. Machine moulding
for railroads, mining, electric use.

THE SARGENT CO.,
686 Old Colony Building, CHICAGO.

THE FORTER-MILLER ENGINEERING CO., INC.

WESTINGHOUSE BLDG., PITTSBURGH, PA.

ENGINEERS AND CONTRACTORS.

Open Hearth, Tube Welding, Heating and Annealing Furnaces. Plants Built Complete.
Best Work. Modern Design. Guaranteed Results. We Build the
Best Gas Producer in the Market.

Swindell Water Seal Gas Producers.

400 built in past three years.

300 Furnaces for all purposes built in past three years.

WM. SWINDELL & BROS., German National Bank Building, Pittsburg, Pa.

The S. R. Smythe Company.

Park Building, Pittsburgh, Pa.

Open Hearth "Steel Tube" and Rolling Mills Complete.

Smythe Gas Producers, 3 Types, most Advanced and Unequaled.

Steam and Hydraulic Machinery, "Buildings," etc

NOTE.—OVER 100 PLANTS BUILT AND IN OPERATION.

G. W. McClure, Son & Co.

Successors to McClure & Amsler,

ENGINEERS AND CONTRACTORS,

SMITH BLOCK, PITTSBURGH, PA.

BLAST FURNACE CONSTRUCTION A SPECIALTY.

Sole Representatives, U. S. A.,

MASSICKS & CROOKE'S PATENT THREE PASS FIRE-BRICK STOVES,
With McClure & Amsler's and G. W. McClure's Patent Improvements.

McCLURE & AMSLER'S PATENT TWO PASS FIRE-BRICK STOVES,
With Center Combustion Chamber.

Open Hearth and Heating Furnaces, Soaking Pits, All Kinds Brick-Work.

Duff's Patent Water Seal Gas Producer.

Over 900 In Successful Operation.

Over 300 Under Construction.

INVESTIGATION SOLICITED.

THE DUFF PATENTS CO.,

924 Carnegie Building, Pittsburgh, Pa.

Open Hearth
Crucible
Annealing
Heating
Tube Welding

FURNACES

ED. E. ERIKSON,

Consulting
and Contracting
Engineer,

Garrison Bldg., Wood St. and
Third Ave., PITTSBURGH, PA.

BLAST
FURNACE
CONSTRUCTION.

BESSEMER
and OPEN HEARTH
STEEL
WORKS.

ENGINEERING.

Walter Kennedy,
ENGINEER.

OFFICE,
631 Penn Ave.,
PITTSBURGH, PA.

Long Distance
Telephone, 3174.

S. V. HUBER & CO.,

CONSULTING ENGINEERS.

Blast Furnaces, Bessemer and Open Hearth Steel Works, Continuous Mills, Hoop Mills, Merchant Mills
Automatic Mill Tables, Labor Saving Devices relating to Rolling Mills, Steam and Hydraulic Machinery

Consulting and Constructing Engineers for the Republic Iron and Steel Co.

Telephone, Pgh. 3356.

Rooms 702-707 Ferguson Building, Pittsburgh, Pa.

ROCKWELL ENGINEERING COMPANY.

FURNACE ENGINEERS;

Builders of OIL, GAS, COAL FURNACES

Fuel Oil Burning Appliances.

Write for Catalogues.

HAVEMEYER BLDG., NEW YORK.

ALEX LAUGHLIN & CO
ENGINEERS
AND
CONTRACTORS.
PITTSBURGH, PA.
Builders of every
description of
FURNACES AND
GAS PRODUCERS
FOR IRON & STEEL WORKS.

DAVID LAMOND,

Contracting Engineer,

Ferguson Block, PITTSBURGH, PA.

BLAST FURNACE CONSTRUCTION.

Agent for C. H. Foote Patent 2 and 4 Pass
Fire Brick Stove.

HENRY AIKEN,

Consulting Mechanical Engineer

Rooms 400, 401, 403, 404 and 405,

Lewis Block,

PITTSBURGH, PA.

THE Cable Address,
"Wellsea Cleveland."
Wellman-Seaver
Engineering Co.,

Consulting and Contracting
Engineers,

CLEVELAND, O., U. S. A.

Steel Works, Rolling Mills, Metallur-
gical Furnaces, Manufacturing Build-
ings, Machinery for the most econom-
ical handling of all kinds of material.

Sole Manufacturers of

FORTER WATER-SEALED

REVERSING VALVES

AND

FRASER-TALBOT MECHAN-
ICAL GAS PRODUCERS.

LONDON OFFICE:
47 Victoria St., Westminster.



THOROUGH INSPECTIONS and

INSURANCE AGAINST LOSS OR
DAMAGE TO PROPERTY AND
LOSS OF LIFE AND INJURY TO
PERSONS CAUSED BY

Steam Boiler Explosions.

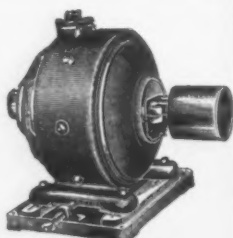
J. T. ALLEN, President.
W. B. FRANKLIN, Vice-President.
F. B. ALLEN, Second Vice-President.
J. B. PIERCE, Secretary.
L. B. BRAINERD, Treasurer.
L. F. MIDDLEBROOK, Asst. Secretary.



Send for a Sample of
Morrison's Patent Self-Lubricating Packing.

ROBT. MORRISON, 5094 Arsenal Street
ST. LOUIS, MO.

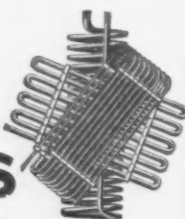
Latest
and
Best.



Type M E Enclosed.

THE NEW ENGLAND MOTOR CO., - Lowell, Mass.

PIPE COILS AND BENDS



Of Every Description.
Made of Iron, Brass or Copper,
Pipe or Tube.

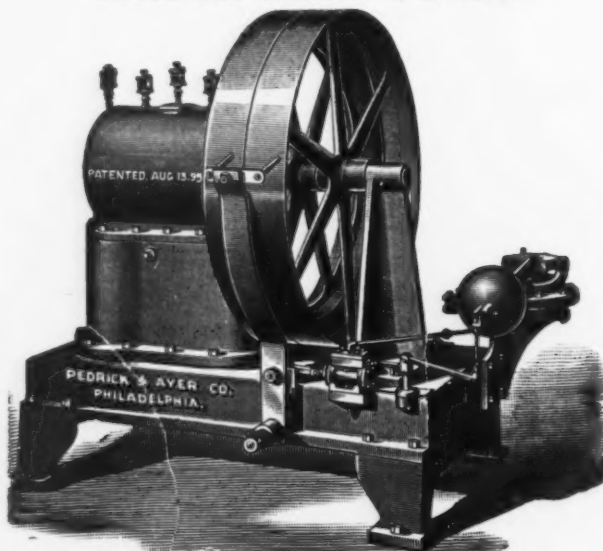
SEND FOR CATALOGUE.

WHITLOCK COIL PIPE CO.,
Hartford, Conn.

Main Office and Works, Elmwood (near Hartford).

AUTOMATIC COMPOUND BELT AIR COMPRESSOR.

PATENTED AUGUST 13th, 1895.



Built in two sizes, Nos. 1 and 2.

No.	Size of Cylinders in inches.	Revolutions per minute.	Cubic Feet of Free Air.	Horse Power required.	Size of Pulleys in inches.	Shipping Weight of Compressor	Floor Space in inches.	Telegraphic Symbol.
1	11x6 6x6	100-140	25-50	2-3/4	40x5	2875 lbs.	60x40	Parian
2	15x10 8x10	90-120	90-120	9-15	60x6	5370 lbs.	78x68	Parian

Pedrick & Ayer Co.,

Spring Garden Station, PHILADELPHIA, PA.

Manning, Maxwell & Moore, Sole Agents, 85, 87, 89 Liberty St., New York City.

22 So. Canal St., Chicago, Ill.

Park Bldg., Pittsburgh.

Williamson Building, Cleveland, O.

FROM THE QUAKER CITY



Manufacturers **FOUNDRY FACINGS and BLACKINGS.**

J. W. PAXSON CO., Phila., Pa.

A TRUTHFUL
GAGE
IS THE ONLY
GOOD GAGE.



CROSBY STEAM APPLIANCES EXCEL.

Steam Engine Indicators,
Recording Gages,
Revolution Counters,
Pressure and Vacuum
Gages,
Lubricators, etc., etc

Stationary and Marine
Valves.
Water Relief Valves.
Blow-Off Valves.
Globe and Angle
Valves.
Single Bell Chime
Whistles.
Send for Catalog.

**CROSBY STEAM GAGE
AND VALVE CO.,**
Boston, New York, Chicago, London.



The Most Re-
liable Valve
For High Pres-
sures Made.

THE EDDY ELECTRIC MFG. CO., Windsor, Conn., U. S. A.

MOTORS GENERATORS

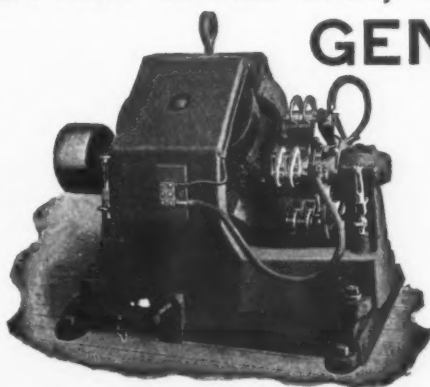
For all kinds of machinery.

Factory transmissions.

Motor Generators, Rotary Transformers, and Boosters.

NEW YORK:

Singer Building,
149 Broadway.



SEND FOR CATALOGUE.

Belt Driven or
Direct Connected
for Electric
Lighting
and Power.

CHICAGO:

838 Marquette Building.

Pittsburgh Valve, Foundry & Construction Co.

HENRY M. ATWOOD, PRESIDENT.
J. T. SPEER, VICE-PRESIDENT.
C. A. ANDERSON, TREASURER.
MOSES ATWOOD, SEC'Y & SALES AGT.
GEORGE E. KLINGELHOFER, GEN'L MGR.

Constituent Firms:—Atwood & McCaffrey; Pittsburgh Valve & Machine Co., Ltd.; Shook-Anderson Mfg. Co.; Pipe Fitting Department of Wilson-Snyder Mfg. Co.; Foundry of A. Speer & Sons.

Offices: Empire Bldg., Pittsburgh, Pa.

ENGINEERS, FOUNDERS, PIPE FITTERS & MACHINISTS

GENERAL ELECTRIC COMPANY'S



Long Burning Arc Lamp
for Incandescent and
Power Circuits.

Modern Arc Lamps

—For—

Modern Machine Shops

Are especially suitable for shops doing
very fine work because of the shadow-
less quality of their light.

GENERAL OFFICE, SCHENECTADY, N. Y.

New York Office, 44 Broad St.

Sales Offices in all Large Cities.

WESTINGHOUSE Motors

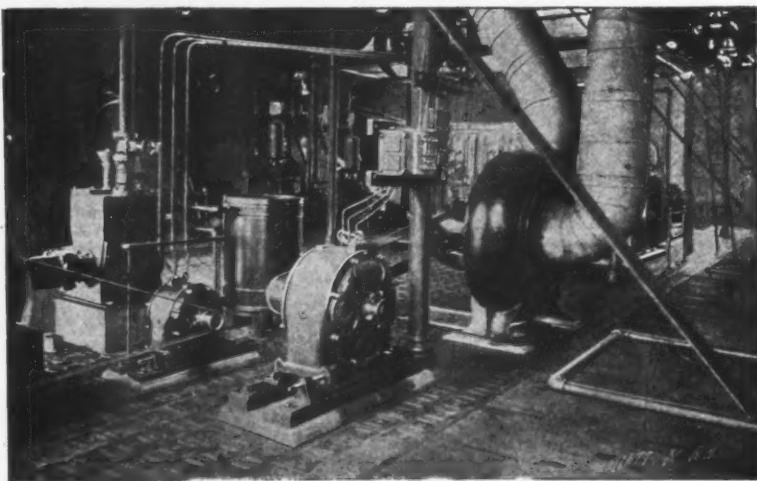
Universally recognized as the
most economic and flexible mo-
tive power for the operation of

Machinery.

Westinghouse Electric
& Manufacturing Co.

All Principal Cities
in U. S. and Canada.

Pittsburg, Pa.



WESTINGHOUSE MOTOR OPERATING BLOWERS.



McNAB & HARLIN MFG. CO.,

— MANUFACTURERS OF —

BRASS COCKS and VALVES

FOR STEAM, WATER and GAS.

Wrought Iron Pipe and Fittings, Plumbers' Materials, Seamless Brass and Copper Tubes.

56 and 60 JOHN ST., N. Y.

Catalogue and Price-List will be sent to the Trade with their first order, or by express, if desired, before ordering.



Blast Furnaces,
Steel Works,
Rolling Mills.

The Wm. B. Pollock Company,

YOUNGSTOWN, OHIO.

Steel Plate Construction.

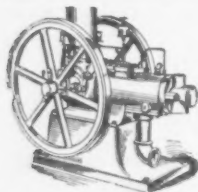
Self-Supporting
Chimneys,
Riveted Pipe,
Converters, Ladles,
Etc.

Boilers,
Annealing Boxes,
Plate Work.

RIVETED WATER PIPE.

WARREN CITY BOILER WORKS, WARREN, O.

Tank Cars,
Riveted Pipe,
Draft Stacks.



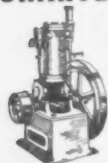
THE MIETZ & WEISS GAS and KEROSENE ENGINES.

Burns **KEROSENE**. Cheaper and safer than Gasoline. Automatic; simple and reliable. **NO** electric battery, **SELF IGNITION**. Perfect regulation. Belted or directly coupled to dynamo for electric lighting **AND ALL POWER PURPOSES**. Send for catalogue.

A. MIETZ, 128-138 Mott Street, N. Y. City

Markt & Co., Ltd., London, Hamburg and Paris.

CHARTER GASOLINE ENGINE.



USED ANY PLACE,
BY ANY ONE,
FOR ANY PURPOSE.
Stationaries, Portables,
Engines and Pumps, Hoisters,
State your Power Needs or your Customers' Power Needs.
Send for catalogue and testimonials.
CHARTER GAS ENGINE CO.,
Box 624, Sterling, Ill.

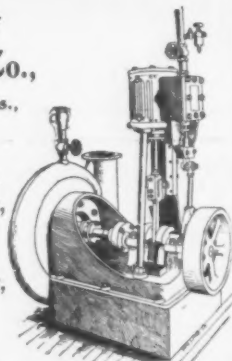


**Lake City
Engineering Co.,**

16th and State Sts.,
ERIE, PA.

Centrifugal Pumps,
Dredging Pumps,
Hydraulic
Dredging
Machinery,
Marine Engines.

GET OUR PRICES.



DO YOU USE UNION COUPLINGS?

If so, try the "Dart Patent."

HUNDREDS OF THOUSANDS IN USE.

A bronze ground joint, with strong malleable iron ends and nut. Non-corrosive.

MANUFACTURED BY

E. M. DART MFG. CO.,

PROVIDENCE, R. I., U. S. A.

Write us for Prices.

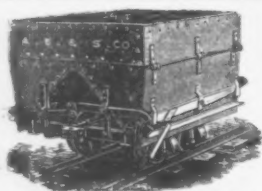
The Wood's Horizontal and Vertical Water Tube Boilers

by long use and hard service have gained a reputation superior to all others. For efficiency, durability and economy they have no equal. Never had an accident, and in ten years' constant use repairs of any kind are almost unknown. They are made on the most scientific and simple principles, no cast iron, manifolds, headers or bent tubes used in their construction; they are accessible to every part by removing but three manholes. Cost less for maintenance, easiest managed, most simply constructed, perfect circulation, drier steam, lowest stack temperature and almost absolute freedom from scale and incrustation. We are the pathfinders of this type of boilers and have them in use in almost every quarter of the Globe.

For waste heat boilers we challenge competition.
Send for illustrated catalogue, Home Office.

JOHN WOOD MANUFACTURING CO.,

Conshohocken, Pa., near Philadelphia.



No. 161 GABLE BOTTOM AUTO-MATIC DUMP.

CAR DEPARTMENT. THE ATLAS BOLT AND SCREW CO.

CLEVELAND, OHIO,

MANUFACTURERS OF SMALL CARS OF ALL KINDS FOR ALL PURPOSES. STEEL CONSTRUCTION A SPECIALTY. COMPLETE EQUIPMENT OF INDUSTRIAL RAILROADS. WHEEL-BARROWS, ETC.

NEW YORK OFFICE: 29 BROADWAY.

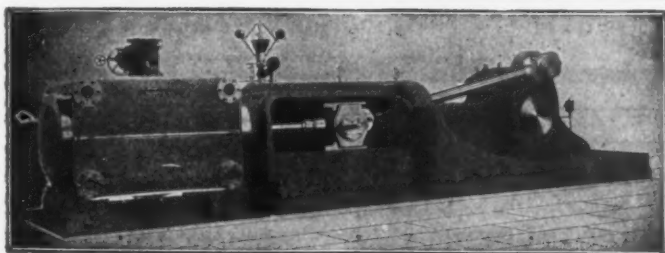


No. 160 GABLE BOTTOM STEEL CAR
Made in 4 sizes.

THE EDWARD P. ALLIS Co.



BUILDERS OF MILWAUKEE, WIS.
REYNOLDS CORLISS ENGINES
 PUMPING, BLOWING AND HOISTING ENGINES.
 SPECIAL ENGINES FOR ROLLING MILLS, ELECTRIC LIGHTING
 AND STREET RAILWAYS.
SAW MILL, FLOUR MILL AND MINING MACHINERY



Eastern Representative, T. W. PHILLIPS, 4 Market Square, Providence, R. I.

THE FILER & STOWELL CO.,

MILWAUKEE, WIS.

HEAVY DUTY CORLISS ENGINES.

Best Design. Best Efficiency. Best Workmanship.

Condensers, Pumping Machinery.
 Compressors, Power Transmissions.

NEWPORT NEWS SHIPBUILDING & DRY DOCK CO.

WORKS AT NEWPORT NEWS VA.
 (On Hampton Roads.)

SHIP AND ENGINE BUILDERS.

Equipped with a Basin Dry Dock capable of docking a vessel 600 feet long, drawing 25 feet of water, at any stage of the tide. Repairs made promptly and at reasonable rates.

For estimates and further particulars, address C. B. ORCUTT, Pres't, NO. 1 Broadway, New York.

SOUTHWARK FOUNDRY & MACHINE CO.,

PHILADELPHIA, PA.,

BUILDERS OF THE

PORTER-ALLEN AUTOMATIC CUT-OFF ENGINE.

Used extensively in Rolling Mills and Steel Works; also for electrical purposes. High economy. Close regulation.

Also builders of Blowing Engines for Blast Furnaces; Reversing Engines for Steel Works; Centrifugal Pumps; Rotary Pumps; Weiss Condensers, etc.

INQUIRIES SOLICITED.

WILLIAM TOD & CO., Youngstown, Ohio.



The Porter-Hamilton Engine.

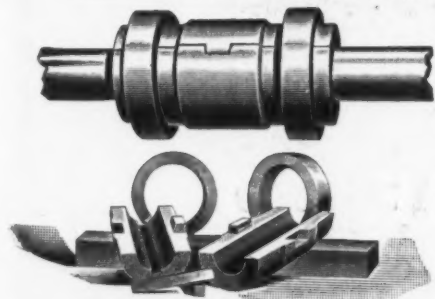
Reversing Engines, Blowing Engines, Converters, Hydraulic and Special heavy machinery for the iron and steel trades.

For Direct Electrical and all High-Class Work.

SEWARD S. BABBITT, Park Building, PITTSBURGH.

The Geo. B. Sennett Co., Youngstown, Ohio.

Manufacturers of SENNETT COMPRESSION COUPLING and other Specialties.



We do not claim novelty in these couplings so much as good material, good workmanship, and extreme simplicity. We make them of a very strong cast iron with wrought iron bands.

Foundry contracts solicited for duplicate castings, 10 lbs. to 5 tons each.



DURANT'S COUNTING MACHINES will keep an accurate record of the amount of work performed by your automatic machinery. Corrects and prevents Mistakes. Counters received highest award at the World's Fair.

—SEND FOR CATALOGUE.—

W. N. DURANT, 233 Twenty-second Street, MILWAUKEE, WIS.

TABOR STOP MOTION COUNTER



You don't have to hunt for centre in shaft and then for your watch while balancing on a ladder.

Send \$1 for Sample. Liberal Discount to the trade. Ask your dealer for it.

Builders of Foundry Molding Machines

THE TABOR MFG. CO., ELIZABETH, N. J.

FIRE AND ELEVATOR PUMPS



should be equipped with our "PRESSURE REGULATOR" to insure perfect regulation.

CATALOG FREE.

THE MASON REGULATOR CO.,

6 Oliver Street, - Boston.

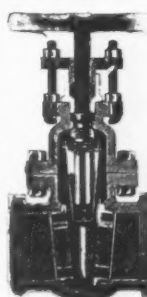
CHAPMAN VALVES

FOR All Purposes.

Water, Gas, Steam, Ammonia, etc., and

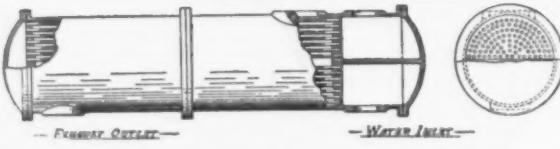
FIRE HYDRANTS.

SEND FOR CATALOGUE



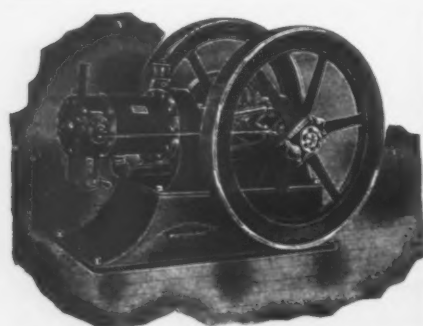
CHAPMAN VALVE MFG. CO.,
 INDIAN ORCHARD, MASS.

<p>THE NATIONAL 164 RIVER ST.</p> <p>COILS —OF— IRON, BRASS OR COPPER PIPE.</p>		<p>PIPE BENDING CO NEW HAVEN, CONN.</p> <p>Combination STOVES —AND— FURNACES</p> <p>for Heating by Hot Water or by Hot Water and Hot Air. SEND FOR PRICES.</p> <p><small>TRADE PAPER ADVERTISING AGENCY, N. Y. —E—</small></p>
---	---	---

<p align="center">STANDARD SURFACE CONDENSERS. WITH CORRUGATED TUBES.</p>	
<p>Taunton Locomotive Mfg. Co., Taunton, Mass.</p>	<p align="center">SEND FOR CATALOGUE.</p> <p align="center">—EXHAUST INLET— WATER OUTLET—</p>  <p align="center">—EXHAUST OUTLET— —WATER INLET—</p>
<p align="center">WAINWRIGHT FEED-WATER HEATERS, EXPANSION JOINTS, Etc.</p>	
<p align="right">AGENTS: CHAS. H. PAINE, 85 Liberty St., N. Y. H. S. WALKER, 1502 Monadnock, Chicago. Tracy Engineering Company, 151-153 Tremont St., San Francisco, Cal. H. M. FIFE, 1218 Holland Bldg., St. Louis.</p>	

BEST MANUFACTURING CO., Pittsburg, Pa.

Brass and Iron Founders,
Pipe Fitters and Machinists,
Manufacturers of ***Best Gate Valves*** **For High and Low Pressure.**



**HIGH GRADE BURGER AUTOMATIC GAS AND
GASOLINE FOUR-CYCLE ENGINES.**

SIZES 15 TO 40 H.-P.

There are no hidden parts or delicate mechanism about the **BURGER AUTOMATIC FOUR-CYCLE ENGINE**. Every part is in sight, direct-acting and positive. All mechanics agree that it is desirable to reduce the working parts to the least possible number that will successfully fulfil the requirements. The simpler the construction, the less liable to get out of order, the more easily comprehended and learned to operate by those unacquainted.

SUITABLE FOR ALL POWER PURPOSES.

The Woolley Foundry and Machine Works,
ANDERSON, IND.

Send for Circular.

THE ONLY
GOLD MEDAL

PARIS EXPOSITION, 1900

FOR EXHIBITION
VALVES AND FITTINGS
WAS AWARDED TO

CRANE CO.

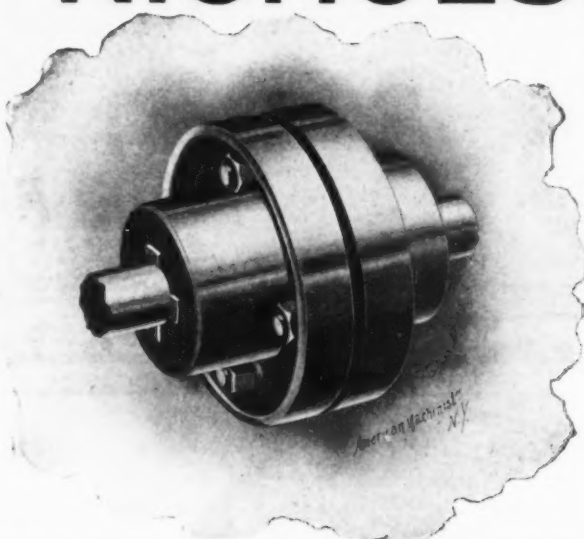
CHICAGO
ESTABLISHED 1858

WRITE FOR POCKET CATALOGUE

NEW YORK
PHILADELPHIA
CINCINNATI
KANSAS CITY
ST. LOUIS
SIENA CITY
OMAHA

ST. PAUL
ST. LOUIS
LOS ANGELES
SAN FRANCISCO
PORTLAND, ORE.

THE NICHOLSON PATENT



FLANGED FACE
COMPRESSION
SHAFT
COUPLINGS

25,000
NOW IN USE.

SEND FOR
CATALOGUE

THE FAIRBANKS CO.,
311 BROADWAY, NEW YORK.

Albany,
Baltimore,

Boston,
Buffalo,

Montreal,
New Orleans,
16 Great Eastern St., London, E. C.

Philadelphia,
Pittsburgh,

NAUGATUCK		SEAMLESS	
●	●	●	●
GUARANTEED FOR ONE YEAR		FOR RECEIVERS STEAM TRAPS REGULATORS ETC.	
TESTED TO 300 LBS.		●	
COPPER		BALL FLOATS	
NAUGATUCK MFG. CO.		NAUGATUCK, CONN.	

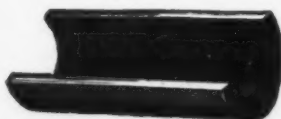


The OLD "SPIRAL" FLUE SCRAPER

Manu-
factured
by

JACKSON FLUE SCRAPER CO., Jackson, Mich.

METALINE.



The best self-lubricating bushing for
block sheaves in the world.

Beware of imitations. The genuine
is branded with a star and we are
headquarters for them.

Send for Catalogue and Prices.

BOSTON & LOCKPORT BLOCK CO.,
BOSTON, LOCKPORT, NEW YORK, U. S. A.
Cable Address, Blocks, Boston.

Will it Save?

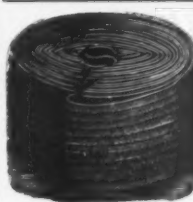
QUERY:—Will it really save enough in
fuel, and boiler wear-and-tear, to earn a
handsome annual dividend on the cost of
its installation? The "it" here alludes to

**The Webster
Feed Water Heater
and Purifier.**

ANSWER:—It most certainly will do pre-
cisely that, and its adoption by those who
"look things up" before buying is the
result of its own powers to prove this
claim. Shall we tell you all about it in a
small Booklet?

Warren Webster & Co.
CAMDEN, N. J.

NEW YORK, 322 BROADWAY.
PHILADELPHIA, 1105 STEPHEN GIRARD BLDG.
CHICAGO, 1809 MONADNOCK BLDG.
BOSTON, 729 TREMONT BLDG.



AMES SWORD CO.

Chicopee, Mass.
Manufacturers of

**Endless Silk Sewed
Polishing Belts.**

CORRESPONDENCE SOLICITED
DISCOUNTS QUOTED.

JUST PUBLISHED.

GAS ENGINE CONSTRUCTION.

A Practical Treatise Describing
in Every Detail the Actual
Building of a Gas Engine.

By HENRY V. A. PARSELL, JR.,
Member A. I. Electrical Engineers,
and ARTHUR J. WEED,
Mechanical Engineer.

Large 8vo. Very Fully Illustrated. With
300 pages. Bound in Cloth.

Price \$2.50.

This book treats of the subject more
from the standpoint of practice than that
of theory. The principles of operation of
Gas Engines are clearly and simply de-
scribed, and then the actual construction
of a half-horse power engine is taken up,
step by step, showing in detail the mak-
ing of a Gas Engine.

First come directions for making the
patterns; this is followed by all the de-
tails of the mechanical operations of fin-
ishing up and fitting the castings. This
is profusely illustrated with beautiful en-
gravings of the actual work in progress,
showing the modes of chucking, turning,
boring and finishing the parts in the lathe,
and also plainly showing the lining up
and erection of the engine.

Dimensioned working drawings give
clearly the sizes and forms of the various
details.

The entire engine, with the exception
of the fly-wheels, is designed to be made
on a simple eight-inch lathe, with slide
rests.

The book closes with a chapter on
American practice in Gas Engine design,
and gives simple rules so that any one
can figure out the dimensions of similar
engines of other powers.

Every illustration in this book is
new and original, having been made ex-
pressly for this work.

CONTENTS.

Chapter I.—How the Gas Engine
Works. Chapter II.—The Four Classes
of Engines. Chapter III.—Design of a
Small Gas Engine. Chapter IV.—Pat-
terns. Chapter V.—Patterns, continued.
Chapter VI.—Patterns, concluded. Chap-
ter VII.—Special tools. Chapter VIII.—
Cylinder. Chapter IX.—Piston. The
Casting; Steel Shell; Turning Piston
Casting; Cutting off the Chuck Piece;
Facing up the Back; Drilling, Boring
and Reaming for Piston Pin; Piston Pin;
Fastening Piston Shell; Lubricating Tube
for Piston Pin; Packing Ring. Chapter
X.—Connecting Rod. Chapter XI.—
Bearings. Chapter XII.—Side Rods.
Chapter XIII.—Bed Plate. Chapter XIV.—
Fly-Wheels and Shaft. Chapter XV.—
Cylinder Head. Chapter XVI.—Inlet
Valve. Chapter XVII.—Exhaust Valve.
Chapter XVIII.—Valve Gearing. Chap-
ter XIX.—Governor. Chapter XX.—
Igniter. Chapter XXI.—Assembling.
Chapter XXII.—Regulating and Start-
ing. Chapter XXIII.—Carbureters.
Chapter XXIV.—Engine Details and
Their Design. Chapter XXV.—Anno-
tated Bibliography of Gas Engine Books
and Periodicals Published in the English
Language.

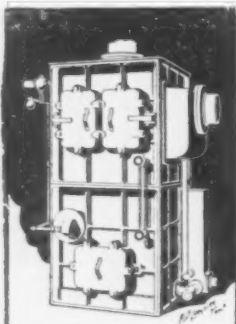
** Copies sent prepaid on receipt of
price.

DAVID WILLIAMS CO.,

232 WILLIAM STREET, NEW YORK.

FEED-WATER HEATERS. WHICH?

The question of which feed water heater to install is not generally regarded with sufficient importance—despite the fact that the right kind of a heater will very materially improve any feed water supply (no matter how bad) by eliminating some, or all, of the scale forming matter present in the water, and by saving the exhaust condensed in accomplishing the heating—despite the fact that a feed water heater will eliminate the strains caused by introducing cold water into economizers, live steam purifiers and boilers, which strains are chiefly recognizable in repair bills and stoppages—and despite the fact that whether the plant is operated high pressure, exhausting free to the atmosphere—whether it is operated under back pressure, using the exhaust steam for heating or drying—or whether it is operated condensing—the right heater will effect a saving of somewhere between 5 per cent. and over 20 per cent. (according to the conditions) of the total amount expended for coal in that plant.



COCHRANE HEATER

The engineers of many of the largest and most modern steam plants have recognized the particular merits of the

COCHRANE FEED WATER HEATERS AND PURIFIERS

for giving practical and efficient service in the utilization of exhaust steam for heating and purifying feed water.

**HARRISON
SAFETY BOILER
WORKS,**

Col. Sta., PHILA., PA.



ASHTON VALVES and GAGES.

Send for Catalogue "A."

ASHTON VALVE CO.,
BOSTON, MASS.

GALVANIZED IRON STORAGE TANKS



From 10 gals. to 7,000 gals. Black iron tanks any size. **GAS ENGINES** from ½ H. P. up. For particulars address **Clarendon Boiler Works,** N. Clarendon, Pa. Please mention *Iron Age*

THE BABCOCK & WILCOX Co.

29 CORTLAND ST.
NEW YORK

CABLE ADDRESS

NEW YORK

"GLOBE BOXES"

ALL FOREIGN OFFICES

"BABCOCK"

WATER TUBE



SEND FOR OUR BOOK "STEAM"

BOSTON
8 OLIVER ST.
PHILADELPHIA
642 DREXEL BLDG.
SAN FRANCISCO
32 FIRST ST.

BRANCH OFFICES
CHICAGO
315 MARQUETTE BLDG.
NEW ORLEANS
315 CARondelet ST.
PITTSBURGH
1217 EMPIRE BLDG.

ATLANTA, GA.
819 EQUITABLE BLDG.
CLEVELAND
103 CLEVELAND BLDG.
MEXICO CITY
7 AVENIDA JUAREZ
HAVANA, CUBA
116 CALLE DE LA HAVANA



THE RAND DRILL COMPANY,

PIONEERS IN ROCK DRILLING AND
AIR COMPRESSING MACHINERY,

128 BROADWAY, NEW YORK

Has been awarded

THREE GOLD MEDALS

at the

... PARIS EXPOSITION ...

for

Air Compressors and Rock Drills.

The LUNKENHEIMER "Handy,"

Gate and Lever Throttle

VALVES



"Handy."

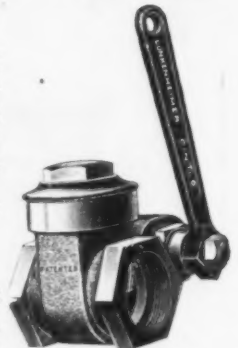
are unequalled in places where reliable, quick-acting valves are required.

The "Handy" is intended for pressures not exceeding 75 pounds, and made in sizes ranging from ½ inch to 4 inches in Brass; 2 inches to 8 inches in Iron, brass mounted; 1 inch to 8 inches in All Iron.

The Lever Throttle Valve is intended and is made for 175 pounds pressure, in Brass ¾ to 2½ inches; Iron Body, brass mounted, 2½ inches to 6 inches. These valves are only made in Screw Ends. Simple, Practical, Low priced.

Specify **LUNKENHEIMER** make
and get the original and best.

Supplied by Dealers. Write for Catalog of brass and iron engineering appliances of superior quality.



"Lever Throttle."

THE LUNKENHEIMER COMPANY,

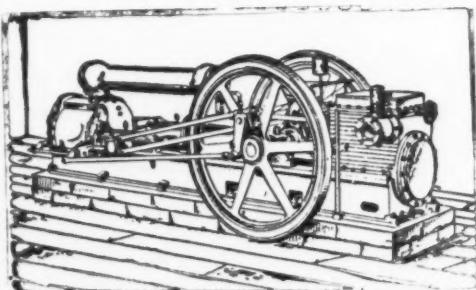
Sole Makers and Patentees.

BRANCHES:

26 Cortlandt Street, New York.
35 Great Dover Street, S. E., London

Main Office and Works:

CINCINNATI, O., U. S. A.



THE NORWALK IRON WORKS CO.,
SOUTH NORWALK, CONN., MAKERS OF
AIR AND GAS COMPRESSORS FOR ANY
VOLUME AND FOR ANY PRESSURE.

THE
ONLY

GRAND PRIX

HIGHEST
AWARD

Given at the Paris Exposition, 1900, to builders of

MINING MACHINERY AND AIR COMPRESSORS

Was awarded to this Com-
pany. In addition to the

GRAND PRIX

THE

The GOLD MEDAL was also awarded

INGERSOLL-SERGEANT

DRILL COMPANY

26 CORTLANDT ST.,

NEW YORK

FOR ALL

AIR COMPRESSORS

AIR USES

SEND FOR CATALOGUE

NEW YORK AIR COMPRESSOR CO.

95 LIBERTY ST NEW YORK U.S.A.

BURRALL IRON CORN SHELLER.

(GOULD'S IMPROVED PATTERN.)

ALL IRON.

DURABLE.

EASY IN OPERATION.

ATTRACTIVE PRICES UPON APPLICATION.
EVERY SHELLER GUARANTEED.

THE GOULDS MFG. CO.,

Works and Main Offices: SENECA FALLS, N. Y.

16 Murray Street, New York.

8 Oliver Street, Boston.

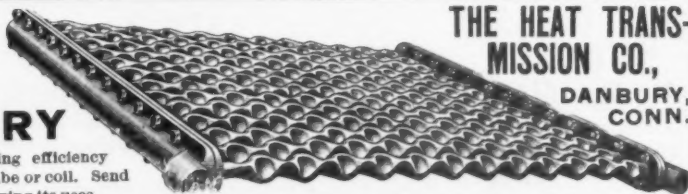
The Gould Co., 22 and 24 N. Canal Street, Chicago.



ROW
INDENTED

TUBE BATTERY

Double the heating efficiency
of plain round tube or coil. Send
for catalogue showing its uses.



THE HEAT TRANS-
MISSION CO.,
DANBURY,
CONN.

AIR COMPRESSORS

FOR EVERY APPLICATION OF

COMPRESSED AIR POWER.

CLAYTON AIR COMPRESSOR WORKS.

26 Cortlandt St., - - - NEW YORK.

Complete Catalogue upon Application.



TUBE WELL SUPPLIES.

COOK'S PATENT

TUBE WELL STRAINERS

AND

STEAM PUMPS

A SPECIALTY.

SEND FOR CATALOG.

A. D. COOK,

Sole Manufacturer,

Lawrenceburg, Ind., U. S. A.



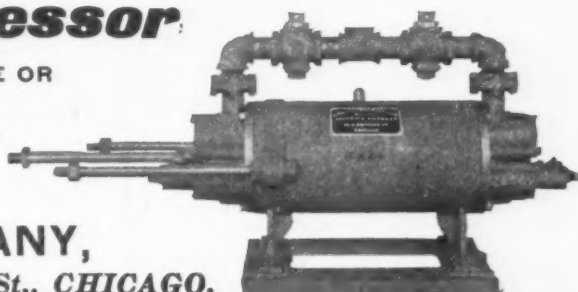
The Fisher Air Compressor

CAN ATTACH TANDEM TO ANY STEAM ENGINE OR
OPERATED BY BELT POWER.

SIMPLEST IN CONSTRUCTION, LESS IN PRICE,
ECONOMICAL, GREATEST EFFICIENCY,
DURABILITY UNEQUALED.

SEDGWICK-FISHER' COMPANY,

53-55 So. Clinton St., CHICAGO.



LEVIATHAN BELTING

is stronger, transmits more power and lasts longer than any other Belt. It runs successfully in

Steam, Water and Extreme Heat.

Belts for Main Driving and work of a heavy nature a specialty.



MAIN BELTING COMPANY,

Sole Manufacturers,

1219-1235 Carpenter St.,
PHILADELPHIA.

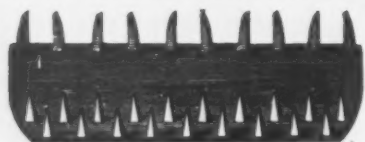
55-57 Market Street, Chicago.
120 Pearl Street, Boston.

ALEXANDER BROS.

BEST OAK Belting

412 N. Third St., Phila.

Talcott's Combination Belt Hooks.



W. O. TALCOTT, Providence, R. I.

MANUFACTURER OF

170 VARIETIES OF BELT HOOKS.

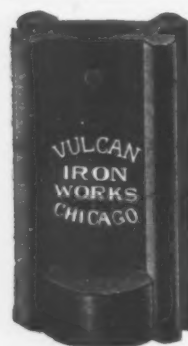
SEND FOR CATALOGUE.

STEAM SHOVELS.

For handling Iron Ore, Coal, &c.,
at Mines, on Docks, or in Blast
Furnace Yards

Detailed information furnished on
application.

THE THEW AUTOMATIC SHOVEL CO.,
LORAIN, OHIO, U. S. A.



**PILE...
DRIVERS,**

Hammers, Nippers,
Sheaves,
Toggle Irons,
Pile Points,
Pile Bands.

VULCAN IRON WORKS,
100 Milwaukee Ave.,
CHICAGO.

LIQUID BRAZING.

The economies and advantages of liquid brazing are not confined to bicycle manufacturers, although they are the ones that have developed it and demonstrated its great advantage and economy over the old-time fire brazing.

One bicycle manufacturer estimates that he is saving twenty dollars per day every day he runs the new system, besides requiring fewer workmen and less fuel.

A descriptive pamphlet will be sent to all who are interested.

JOSEPH DIXON CRUCIBLE CO.,
Jersey City, N. J.

London Office, 28 Victoria St., Westminster.



Without A Rivet,

Thus insuring a smooth inside surface and free delivery. Any gauge or length of bucket to 16 feet long, of one continuous body piece.

THE CLEVELAND

ELEVATOR BUCKET CO.,

OFFICE AND FACTORY,

285 St. Clair Street, Cleveland, O., U. S. A.

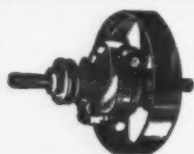
ROPE TRANSMISSION

Shafting, Pulleys, Ring Oiling Bearings, Gearing,
Friction Clutch Pulleys,

PULLEY MOULDING MACHINES,

PULLEY LATHES.

T. B. WOOD'S SONS, - Chambersburg, Pa.



Friction Clutch Pulleys

... OR ...

Cut-Off Couplings.




Especially adapted for GAS ENGINES or MACHINERY of any kind.

The simplest, strongest and best clutch made. Has positive grip and absolute release. Requires little effort to throw friction in or out.

Four distinct catalogues issued and mailed free upon application, viz.: Pulley, Warm Air Furnace, Well Pumps, and Stoves.

HESS SNYDER & CO., Massillon, O.



JEFFREY
Roller, Steel and Special CHAINS for
**ELEVATING
AND
CONVEYING
MACHINERY**
**WIRE CABLE
CONVEYORS.**
For long and
short distance
conveying.

THE JEFFREY MFG. CO., Columbus, Ohio.
Send for Catalogue. 41 Dey Street, New York.



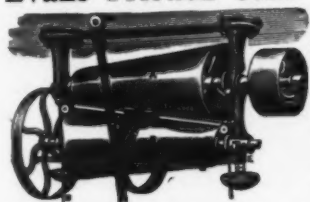
**Edbert
Wood
Split
Pulleys.**
SAGINAW MANUFACTURING CO.
SAGINAW, MICH., U. S. A.
New York Branch: 44 Dey St.
Chicago Branch: 35 So. Canal St.
Sales Agencies in all the Principal Cities.
Cable address: ENGRAVE. ABC and Lieber's Codes

CHAIN HOISTS.

One man lifts eight tons, and lifts it easier, faster and safer with **SPEIDEL'S IMPROVED ECONOMIC SAFETY HOIST** than with any other made. Let us send you our catalogue A and prices.

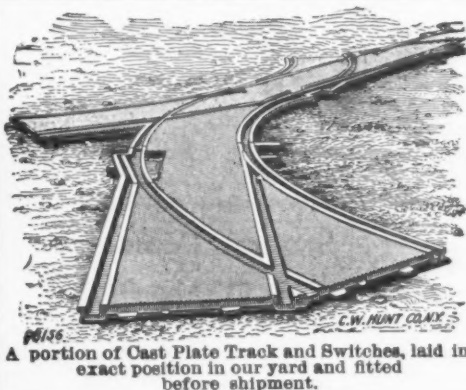
J. G. SPEIDEL,
Reading, Pa.

Evans Friction Cone Pulleys.



For varying speed of machine while running.
6,000 sets in operation, transmitting from 1 to 46 H.P.
Send for Illustrated Catalogue to

G. F. EVANS, 85 Water St., Boston, Mass.
C. W. BURTON, GRIFFITH & Co., London Agents



Cast Plate Track

For use in connection with our "Industrial" Railways. The small diamond point projections prevent the slipping of the workman's foot and permit a broom to easily sweep out the ashes or dirt.

A new "Industrial" Railway Catalogue, covering several new features, is just from the press. Valuable data, not published elsewhere, is therein contained. To those interested, it is sent free.

Please address the works direct.

C. W. HUNT CO.,

Davis Avenue, West New Brighton, N. Y. City

The Aultman Company,
CANTON, OHIO.
**COAL AND ASHES
HANDLING MACHINERY.**
SEND FOR CATALOGUE AND PRICES.
EASTERN OFFICE
718 FIDELITY BUILDING.
PHILADELPHIA PENNA.

FAIRMOUNT MACHINE CO.,

Twenty-second and Wood Sts., Philadelphia, Pa.

Shafting, Gearing, Self-Oiling Bearings, Friction Pulleys, Rope Transmission, Freight Elevators.

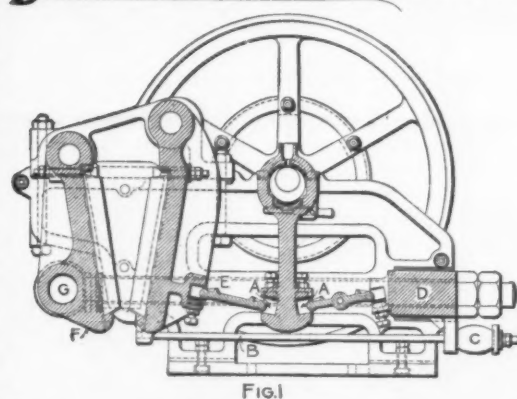
Looms, Harness Motions, Dobbies, Machinery for Winding, Spooling, Reeling, Beaming, Warping, Dyeing, Sizing, Scouring, &c

This shovel is used in the construction of the **RAPID TRANSIT TUNNEL NEW YORK CITY.**
STRONG AND DURABLE. TRY IT!
THE GENERAL SUPPLY CO., 40 John St., New York.



SEND FOR PRICES.

BUCHANAN'S PATENT ROCK AND ORE CRUSHER.



ALL parts subjected to direct strain are made of open hearth steel castings or forgings. The strongest and most durable Crusher on the market.

PORTABLE CRUSHER on Wheels for township work. Sizes: 7 in. x 10 in. to 24 in. x 36 in. Single or Duplex. Capacity from fifty to one thousand tons per ten hours. **COMPLETE CRUSHING PLANTS OUR SPECIALTY.** We will send free on application our catalogues on Buchanan's Rock and Ore Breakers, Buchanan's Crushing Rolls, Magnetic Separators, —

Power Transmitting Machinery.

GEO. V. CRESSON COMPANY,

NEW YORK, 141 Liberty Street.

PHILADELPHIA, 18th St. and Allegheny Ave.

C. G. BUCHANAN, Consulting Engineer.

Department Crushing and Concentrating Machinery.

No. 1.

LINK BELT ELEVATORS, CONVEYORS. Power Transmissions.

"Modern Methods" Catalogue illustrates and describes machinery for handling

Coal, Ashes, Stone, Fertilizers, Cement, Grains, Barrels, Boxes.

ANY MATERIAL IN BULK OR PACKAGE.

Copy mailed on request.

Link-Belt Engineering Company,

Nicetown, Phila.

Park Building, Pittsburgh, Pa.

49 Dey St., N. Y. City.



CALIFORNIA WIRE WORKS,

9 FREMONT STREET, SAN FRANCISCO, CALIFORNIA.

MANUFACTURERS AND CONTRACTORS.

Single and Double Rope Tramways and Cableways.

HALLIDIE PATENT ROPEWAYS,

for transporting ore, fuel, merchandise, sugar cane, etc. Hallidie Patent Combined Scraper and Conveyor, plows and scrapes earth, etc., and conveys any distance.

Grip Pulleys, Improved Durable Wire Ropes.

Estimates and Designs Furnished. Send for Catalogue.

COAL and ORE HANDLING MACHINERY, HANDLING MACHINERY for SHIP YARDS.

The Brown Hoisting Machinery Co., Incorporated,

NEW YORK OFFICE, Havemeyer Building.
PITTSBURG OFFICE, Carnegie Building.
EUROPEAN OFFICE, 39 Victoria Street, London, S. W.

CLEVELAND, OHIO, U. S. A. CRANES OF ALL TYPES,

Electric, Steam and Hand Power.

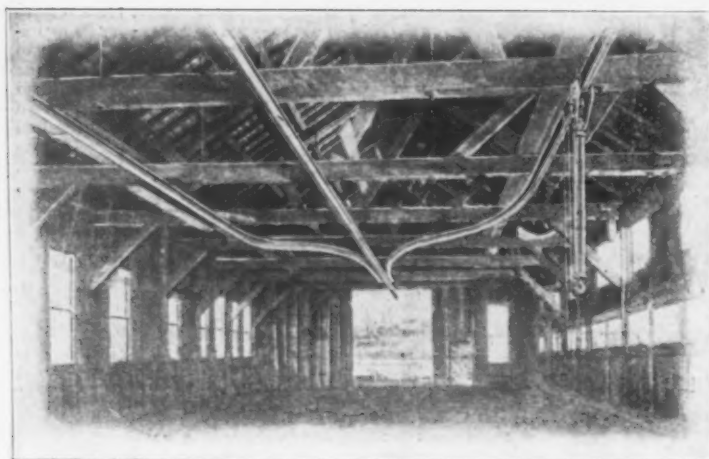
Send for Catalogue.

**ALL
KINDS**

HOISTS

**FOR ALL
PURPOSES.**

EDWIN HARRINGTON, SON & CO., - - - PHILADELPHIA, PA., U. S. A.



PNEUMATIC SELF-TRAVELING TROLLEYS.

Adapted to any Service where Weights and Substance in Bulk is to be Handled, Doing Away with Hand Labor. The Only Overhead Automatus Device Having Perfect Mobility, Traversing any Distance, Turning Corners, Switching from One Track to Others, Running on to Transfer Tables, Covering any Desired Rectangular Space, Quick Acting, Economical to Operate and Maintain, Free from Fire Risk and Suitable for the Mercantile Business as well as Manufacturing.

Write for Information and Prices.

PNEUMATIC CRANE CO.,

Builders of Overhead Traveling Cranes and Air Hoists,

26th and Liberty Sts., - PITTSBURG, PA.

"GOD BLESS US EVERY ONE"

Was Tiny Tim's Christmas prayer. What better greeting for you and us as the Century dies and this its last Christmas!

How the time runs away! Only yesterday it was last Christmas and in another day or two it will be next Christmas. Time goes and we are getting old. The apprentice becomes the journeyman. The journeyman is now the foreman. The foreman is General Superintendent and the faithful superintendent is General Manager or Partner.

The downy lipped junior partner moves to the desk in the inner office and the grizzled, old, gentle-voiced seniors who founded the business, built it up and gave it the best of their lives, at last lay down the work they have done so long and so well and go to their reward.

As with men, so with machines. The passing years make the good machine. The good new thing of last year becomes the "Old Reliable" best thing of next year—No, sir; nothing about Cranes, Elevators and Air Hoists this time. It's Christmas.

But say, brother, you and us who have talked together here every week, aren't we greatly blessed in that this joyous Christmas time finds us here happy and prosperous? If we have been able to make you happy, you many orders have made us prosperous. We have told our little story Thursday after Thursday, poorly enough, dear knows, but the best we knew, and you have so patiently listened to us and believed us, and sent your orders to us, and said nice things about us and—

Well, we were just thinking how nice it is that we have been thus mutually helpful and useful to each other. This is the true secret of a good life after all, isn't it?

And it is a good thing to stop once in a while in this mad scramble we call "Business" and think of such things.

"Please Take the Elevator."

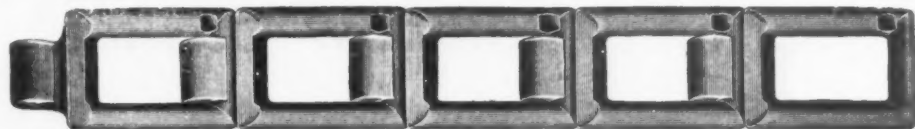
May your aspirations go like the elevator—UP.

CRAIG RIDGWAY & SON CO.,

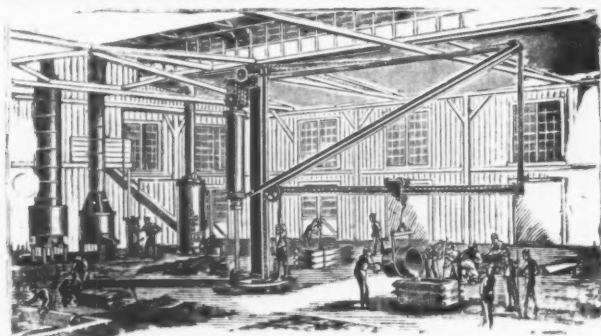
COATESVILLE, PA.

EUROPEAN AGENT,

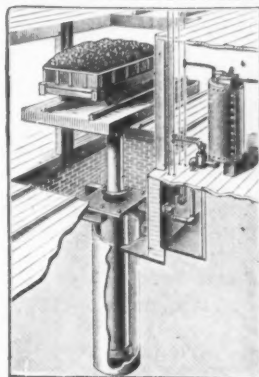
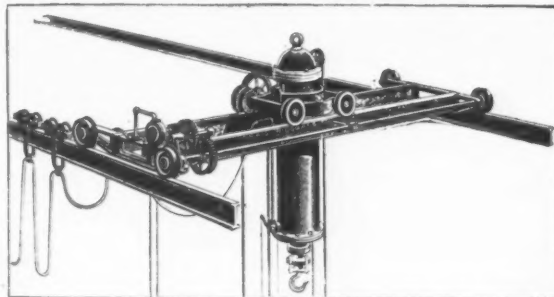
CHAS. G. ECKSTEIN, 16 Spandauerstr., BERLIN, GERMANY.



Buhl Malleable Co., Detroit, Mich.



5-Ton Steam Hydraulic Crane in a Foundry



N. Y. Warehouse
and Office,

37 WARREN ST.

Alder & Boyd,

N. Y. SALES AGENTS.

JUSTLY PROUD IS UNCLE SAM
OF THE

DODGE

MANUFACTURING CO.,

CONTRACTORS,
ENGINEERS,
FOUNDERS
& MACHINISTS.

WORKS AND MAIN OFFICE
MISHAWAKA,
INDIANA, U.S.A.

TRADE
INDEPENDENCE
MARK

INDEPENDENCE
WOOD
SPLIT PULLEY

OVER 2,000,000
IN DAILY
USE.

BRANCHES:
NEW YORK. CHICAGO.
BOSTON.
ATLANTA. LONDON, ENG.




SELL THE BEST
THE "SURE GRIP"
Steel Tackle Block

Is taking the place of all
other hoisting blocks.

Send for catalogue and discounts

Fulton Iron & Engine Works,
28 Brush St., Detroit, Mich.

ESTABLISHED 1852.

—OR—
RICE LEWIS & SON, Ltd.
TORONTO, CANADA.



Builders

of machinery of any
description are

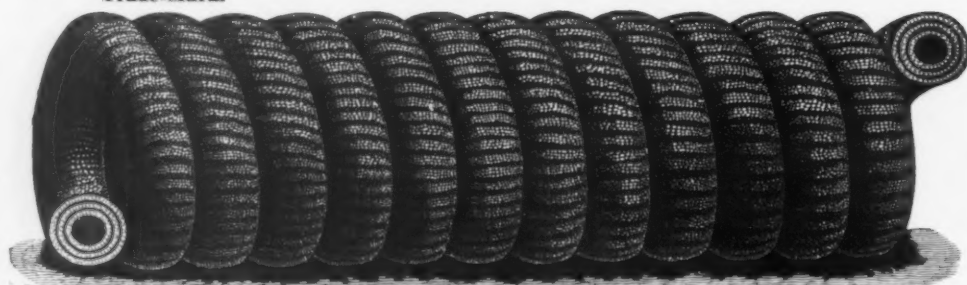
LOOKING FOR Bearings

that will run cold, save oil, coal, obliterate
friction and show **RESULTS.**
Write for particulars.

BALL BEARING CO., Boston, Mass.

NOX-ALL SPIRAL PACKING.

Trade-Mark.

The
Original.The
Best.

Made of the finest materials, thoroughly lubricated, free from acid and grit. Soft, elastic and durable. Will withstand the heat of high pressure steam.

Manufactured by **BOSTON BELTING CO.,**

James Bennett Forsyth,
Mfg. Agt. and Gen. Mgr.

BOSTON.

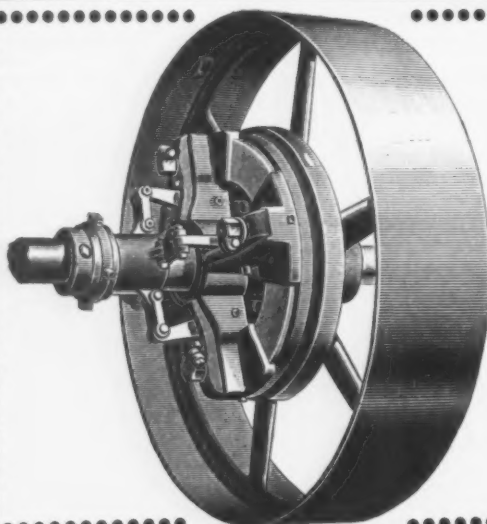
NEW YORK.

BUFFALO.

CHICAGO.

MILWAUKEE.

KANSAS CITY.



DO YOU KNOW THAT—

FRISBIE FRICTION CLUTCHES

ARE FREQUENTLY USED
WHERE OTHERS FAIL?

The reason for this is found in their Simplicity, Great Strength and Powerful Grip.

We exert our best efforts to build them well and never over-rate them.

ASK FOR INFORMATION AND PRICES.

The Eastern Machinery Co.,

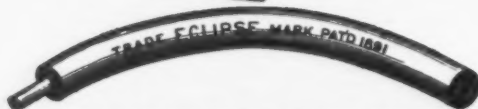
146 ASHMUN ST., - - - NEW HAVEN, CONN.

The Eclipse Sectional Rainbow Gasket.

$\frac{3}{8}$ in. }
 $\frac{1}{2}$ in. } for Hand Holes.
 $\frac{5}{8}$ in. }



$\frac{3}{4}$ in. }
 $\frac{7}{8}$ in. } for Extra Large
1 in. } Joints.



Fac-Simile of a 6-inch Section of Eclipse Gasket, Showing Name and Trade-Mark Imbedded.

The Eclipse Gasket is red in color, and composed of the celebrated Rainbow Packing Compound. It will not harden under any degree of heat, or blow out under the highest pressure, and can be taken out and repeatedly replaced. Joints can be made in from three to five minutes.

Patented, Copyrighted and Manufactured Exclusively by

THE PEERLESS RUBBER MANUFACTURING CO., - 16 Warren Street, New York.

16-24 Woodward Avenue, Detroit, Mich.

17-19 Beale Street, and 18-24 Main Street, San Francisco, California.

203-210 So. Water Street, Chicago, Ill.

The All-Wrought Steel Split Pulley.

Patented and Patents Pending in U. S.

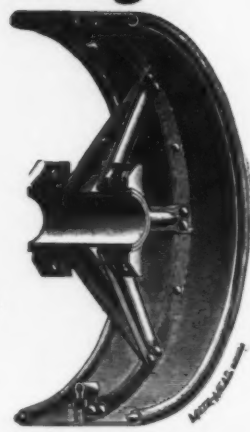
Patented Throughout the World.



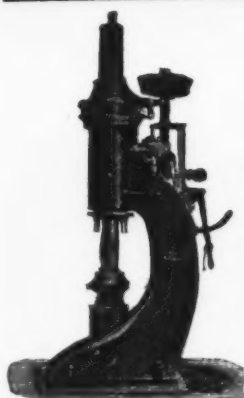
INTERCHANGEABLE METAL BUSHINGS
TO FIT
ALL SIZES SHAFTING.

Sold by the best Hardware and Supply
Houses all over the World.

SEND FOR CATALOGUE AND PRICES.



THE AMERICAN PULLEY COMPANY - Philadelphia, Pa.



William Sellers & Co. Incorp.

Philadelphia, Pa.

STEAM HAMMERS.

NOTE.—Our smaller hammers (from 400 pounds up to 3150 pounds weight of bar) are made with a single leg, or upright, and overhanging cylinder provided with automatic valve gear. Our hammers of more than 3150 pounds weight of bar are made with two legs, or uprights, with cylinder bolted between the uprights. We show a 1250 lb. hand and self-acting steam hammer.

ELECTRIC AND HAND TRAVELING CRANES.



PAWLING & HARNISCHFEGER,
Chicago Office, G. P. NICHOLS & BRO., Managers, 1325 Monadnock Bldg.
Pittsburgh Office, Fidelity Building.
161 Clinton Street, Milwaukee, Wis.
New York Office, A. A. DeBONNEVILLE, Mgr., Bowling Green Bldg.

- CRANES -



NORTHERN ENGINEERING WORKS NO 8 CHENE ST. DETROIT, MICHIGAN.

CLEVELAND CRANE AND CARCO
L. H. GIBSON
EASTERN AGT.
PARK BLD'G.
PITTSBURG, PA.
116-138 WASON ST.
CLEVELAND O.

READING CRANE & HOIST WORKS READING, PA.

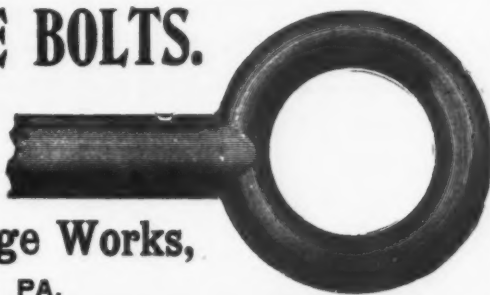
HAND POWER TRAVELING CRANES in all sizes and styles.
SPUR GEARED CHAIN BLOCKS with Patent Automatic Friction
Brake from $\frac{1}{4}$ ton to 20 tons capacity.

Overhead Tracks, Trolleys, Switches, Etc.

STANDARD EYE BOLTS.

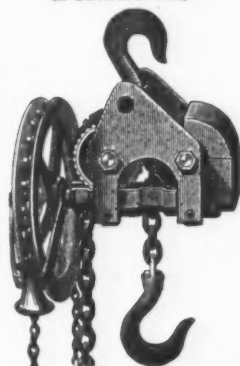
DROP FORGED FROM STEEL
WITHOUT WELD.

Keystone Drop Forge Works,
PHILADELPHIA PA.



BOX'S DOUBLE SCREW CHAIN HOISTS. (PORTABLE)

ALL CAPACITIES



RANGING TO 20,000 LBS.

WRITE FOR LIST AND NEW DISCOUNT SHEET.
ALFRED BOX & CO.,
Front and Poplar Sts., PHILADELPHIA.
Hoists and Trolleys, Hand or Electric, for
Travel on Lower Flanges of I Beams.



The "King" Chain Block

With Patent Automatic Friction
Brake.

1000 to 20,000 lbs.
Capacity.

Portable Beam Punches.
Hand Punches and Shears
Combined.

Scroll and Screw Punches.

Sheet Iron Shears.

Clamp Drills.

CHAS. G. ECKSTEIN,
249 Centre St., New York.

STOW FLEXIBLE SHAFT



Invented and
Manufactured by

**THE
STOW MFG. CO.**
Established 1876

Binghamton,
N. Y.

PORTABLE

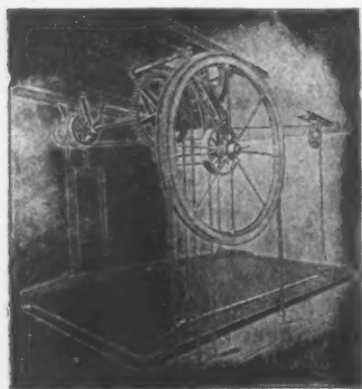
DRILLING.
TAPPING,
REAMING.

General European Agents,

SELIG SONNENTHAL & CO.,

Queen Victoria St.,

LONDON, ENGLAND.



Freight and Passenger

HAND and POWER

ELEVATORS

STEEL ROLLER BEARINGS,

EASY TO SET IN PLACE, RUN EASY.

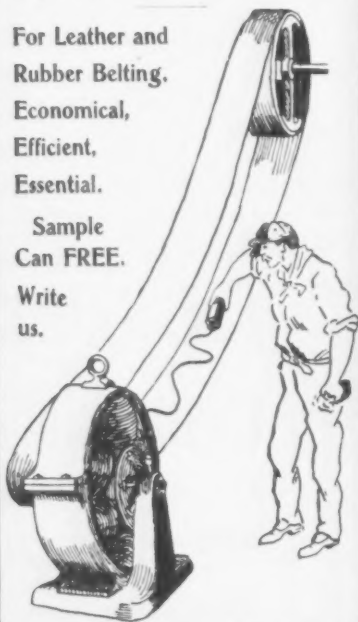
VARIETY MACHINE CO., Warsaw, N. Y.

NEW YORK AGENTS:

WHITE, VAN GLAHN & CO., 15-17 Chatham Square, 49 East 42d Street, New York.

THE HAVEN ELEVATOR CO.,

High Service Elevators, Passenger, Freight, Hydraulic, Electric, Belt and Hand Power. WRITE FOR ESTIMATES. Cincinnati, O.

THE ENGINEERS' BELT
DRESSING CO., CLEVELAND, O.For Leather and
Rubber Belting,
Economical,
Efficient,
Essential.Sample
Can FREE.Write
us.

The Nicholson Patent Flanged Face Compression Shaft Coupling.

Manufactured by

W. H. Nicholson Co.,

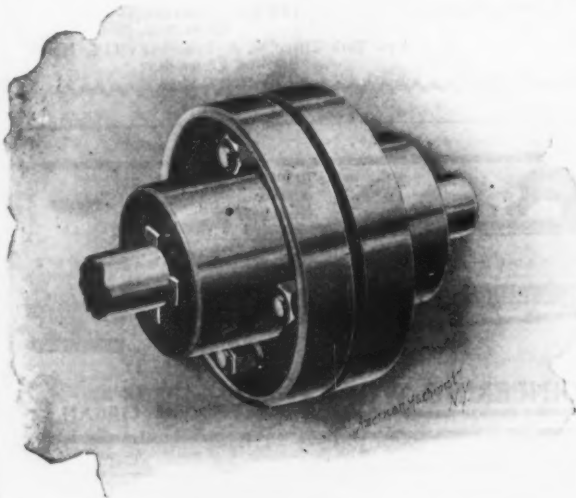
WILKES-BARRE, PA.

25,000 NOW IN USE.

The Best Coupling made for
many reasons. Let
us explain.

SOLD BY

THE FAIRBANKS Co.,

New York,
Boston,
Buffalo,
Philadelphia,
Baltimore,
Pittsburg,
Albany,
New Orleans,
Montreal, P. Q.

FREE FROM COMPLICATIONS

Simplicity.

To the crane operator, who has to handle a
battery of controllers, simplicity of operation
is exceedingly important.Simplicity of operation is a strong point of
the Dinky Ventilated Controller. There are
no complicated devices to confuse the opera-
tor, no separate reversing switch to keep track
of and to operate—a single lever on each
controller does the business—starts, stops
and reverses, and whenever the lever is moved
in a given direction it produces the same
motion EVERY TIME.Another important feature of this con-
troller is the magnetic blow-out, which pre-
vents arcing and increases life of segments
and brushes at least four fold. Also prevents
the sticking of brushes to segments.Other features are, thorough ventilation,
ease of installation, durability and low cost
for keeping in repair.

Write for catalogue and full particulars.

The Electric Controller & Supply Co.,

Mfrs. and Consulting Electrical Engineers,
Cleveland, Ohio.

Elevators,

PASSENGER

AND

FREIGHT.....

Specialty

Hindley Worm Gearing.

Morse, Williams & Co.,

PHILADELPHIA.

Send for Catalogue R.

Electric Wiring. By CECIL F. FOOLE. Containing
numerous elementary tables and formula. Illus-
trated with diagrams. 12mo, limp leather ..\$1.00
For sale by David Williams Co., 232 William St., N.Y.

NORTON EMERY AND CORUNDUM WHEELS.

GOLD MEDAL AWARD AT PARIS EXPOSITION, 1900.

NORTON EMERY WHEEL CO.,
Worcester, Mass.

Chicago Store, 25 South Canal St.



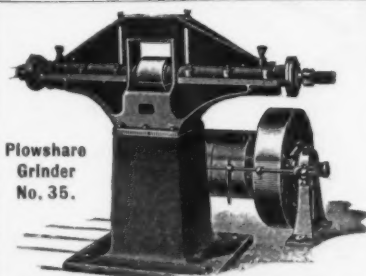
**Northampton
Emery Wheel Co.,**

LEEDS, MASS.
CHICAGO, ILL.

No. 00 Tool Grinder.

Emery Wheel, 10½ in. x 1 in.

Complete
Catalogue
on
Application



Plowshare
Grinder
No. 35.

THE
SAFETY EMERY WHEEL
COMPANY,
MFRS. OF
EMERY WHEELS
AND
GRINDING MACHINERY.
Pioneers of the only successful safety system of using Emery Wheels.
SEND FOR CATALOGUE.
SPRINGFIELD, O.

If you grind saws, thin cutters, thrust washers, etc., send for our Disc Grinder Catalogue.

UNIVERSAL MACHINE CO., Providence, R. I., U. S. A.
DeFRIES & CO., Agents for Germany, Austria and Russia.

HIGH-GRADE Buffing and Polishing Wheels.

OUR CATALOG TELLS THE STORY—
WRITE FOR IT.

MAKERS OF THE CELEBRATED

"Compress" Polishing Wheel.

DIVINE BROTHERS CO., Utica, N. Y., U.S.A.

Give Carborundum Wheels a Trial.

We run the risk—if there is any. All we ask of you is that you shall make the trial. Our guarantee says:

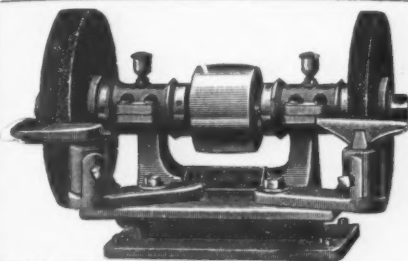


will save money to its users. That means it will do more work, better work, faster work than any other abrasive. If it doesn't we are the losers.

Carborundum is made in the form of wheels, blocks, paper, grains or powders.

Write for the Carborundum booklet.

The Carborundum Company,
Niagara Falls, N. Y.



DRY GRINDERS of all kinds,
EMERY WHEELS and
SPECIAL GRINDING MACHINERY.
SPRINGFIELD MFG. CO. - Bridgeport, Ct.

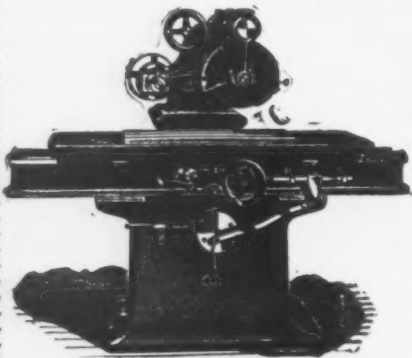
AMERICAN WHEEL PROVIDENCE, R.I. EMERY WORKS.

POROUS EMERY WHEELS

may be called self-sharpening files. Vittrified Emery Wheels are porous and cut as free when nearly used up as when first put in use.

SEND FOR CATALOG.

VITRIFIED EMERY WHEEL CO., Westfield, Mass., U. S. A.



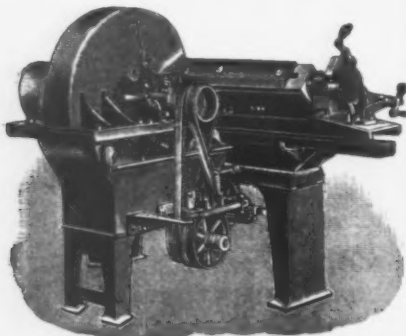
Surface Grinders.

These machines are very heavy and substantial. The work we put into them enables our customers to get work out of them. They are in use by Jewelers, Bolt and Nut Mfrs., Silversmiths, Drop Forge Works, and a large number of others. They all speak highly of the machine.

Write us and we will prove to you that our Surface Grinders are the best on the market.

Diamond Machine Co.,

Providence, R. I., and Chicago, Ill.



Bridgeport Safety Emery Wheel Co.,
BRIDGEPORT, CONN., U. S. A.

Patentees and manufacturers of Emery Wheels and Emery Wheel Machinery. Send for prices.

DIAMOND TOOLS

ARE
Invaluable for changing the shape of faces of Emery, Corundum or Carborundum Wheels.
By their use any desired shape may be obtained.

Send for Descriptive Catalogue and Price-List.

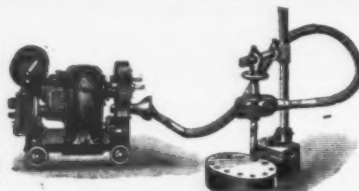
THOS. L. DICKINSON,

45 Vesey St., - New York City.



If every Williams Drop-forging were a holly berry, one would wonder where so much holly grew. If W's forgings were mistletoe and yuletide associates "St Nick's" load would outrank Atlas'. If you would carry some of "Nick's" pleasure-giving load just send for free red book "F"—a guide to a full business "stocking." On the envelope write:

J. H. WILLIAMS & CO., Brooklyn, New York.



UNEQUALLED

as a PORTABLE TOOL for drilling, grinding, boring, reaming.

STOW FLEXIBLE SHAFT and TOOLS, operated by the General Electric Co.'s Motor. See Catalogue 4.

STOW FLEXIBLE SHAFT CO.,

26th and Callowhill Sts., Philadelphia.

FREDERIC SCHOFF Proprietor



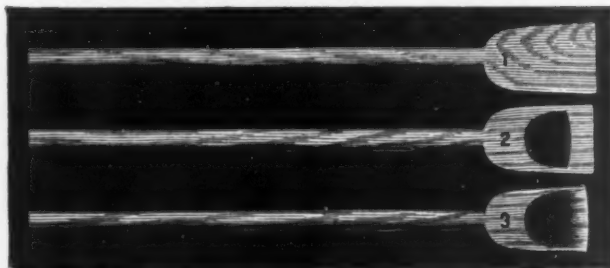
STERLING

EMERY WHEELS.

On account of their POROSITY and consequent "FREE CUTTING" qualities many users of SAW GUMMING WHEELS prefer wheels made by the vitrified process. Our "STERLING" is so made, and 20 years' experience has put us away beyond the experimental stage, a fact worth considering. If you want a fast cutting wheel let us hear from you.

THE
STERLING EMERY WHEEL MFG. CO.,
TIFFIN, O.

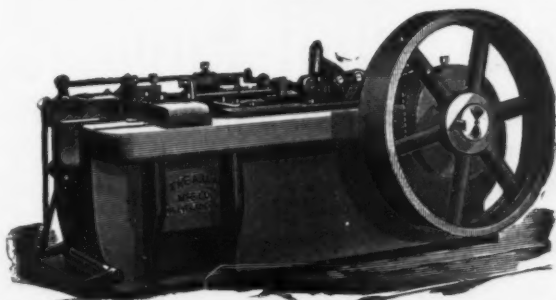
ESTABLISHED 1850.
DEFIANCE MACHINE WORKS, - Defiance, O.
— INVENTORS AND BUILDERS OF —
AUTOMATIC WOOD WORKING MACHINERY.



FOR MAKING
"D"

Shovel Handles, Fork
Rake, Hoe, and Broom
Handles, Hubs,
Spokes, Wheels, Wag-
ons, Carriages, Rims,
Shafts, Poles, Neck
Yokes, Single-Trees,
and Barrel Hoops.

THE AJAX MANUFACTURING COMPANY,
CLEVELAND, O., U. S. A.

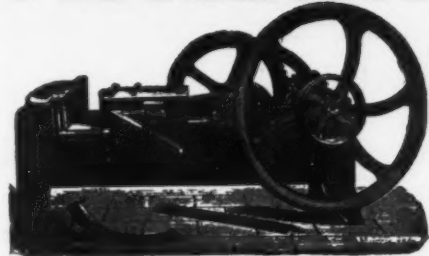


Sole Manufacturers of
The Blakeslee Improved

Bolt Headers,
Rivet Headers,
Upsetting Machines,
General Forging Machines,
Hot Pressed Nut Machines,
Buildozing and Bending Machines,
Forming Machines and
Special Nut and Bolt Machinery.

PITTSBURGH MFG. CO..

BUILDERS OF



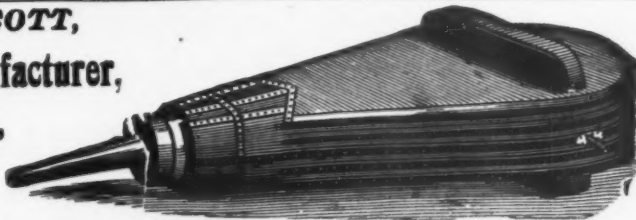
**Crosgrove's Patent Straightening,
Bending and Punching Machines.**

MANUFACTURERS OF

BOLTS, NUTS, RIVETS, CASTINGS, ETC.

Pittsburgh, Pa.

GEO. M. SCOTT,
Bellows Manufacturer,
Johnson Street,
Cor. 23d St.,
CHICAGO, ILL



C. H. Condrey Machine Works.
GOVERNMENT CONTRACTORS
— MACHINISTS —
CONTRACTORS, BUILDERS & DESIGNERS
SPECIAL MACHINERY.
5 Main Street.
Fitchburg, Mass.

**RAWHIDE
GEARS.**

MANUFACTURED BY
Horsburgh & Scott,
CLEVELAND, OHIO.



**No. 2
Tool
Grinder.**

All gear driven.
Heavy, well-made
throughout.
Used by plumbers,
blacksmiths, mills,
mines, quarrymen, etc.,
etc.
Sold by the leading
jobbers throughout the
world.

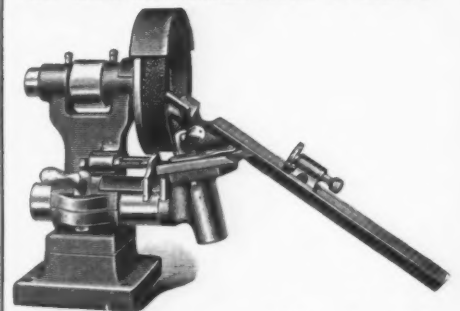
List \$10.00
Liberal Discount.

Representatives:
Brown & Wales, Boston,
Mass.; Scott Supply & Tool
Co., Denver, Colo., and
hundreds of others.

Manufactured by
UNION MFG. CO.

Manufacturers of full
line of foot power grind-
ing tools, and
hardware
specialties,
20 Brecken-
ridge St.,
BUFFALO,
N. Y.

The New American Drill Grinder.



Do you notice how rigidly the drill holder is supported? **This is most important** if you want your drills to have lips of equal length.

You don't have to take a shower bath every time you grind a drill as is the case with some machines where water is used on the wheel.

Write for catalog and full information.

L. S. HEALD & SON,
Box 557, **BARRE, MASS.**
Sold by Chas. Churchill & Co., London, Birmingham,
Manchester and Glasgow L. M. Ramsey & Co.,
St. Louis, Mo. Hill, Clarke & Co., Boston and Chi-
cago, New York City, The Garvin Machine Co.,
Manning, Maxwell & Moore, The Garvin Machine
Co., Berlin Germany, and Austria.

BUY
"Standard" TOOLS
 BECAUSE THEY ARE EXACT!
 HIGHEST QUALITY ONLY

The Standard Tool Co., CLEVELAND, OHIO. 94 Reade St., New York.

Our expansion reamer is unique in this—it's the only one made that will expand and contract. It will make both tight and loose fits every day in the week.



NEW YORK STORE, 99 Reade St.
 FENWICK FRERES & CO., 21 Rue Martel, Paris.

CLEVELAND TWIST DRILL CO.,

Cleveland, Ohio,
 U. S. A.

This will interest you if you ream Cored Holes.



FOUR GROOVE CHUCKING REAMER.

NEW PROCESS TWIST DRILL CO.,

CATALOGUE FREE.

Taunton, Mass., U. S. A.

10
 Styles
 Floor
 and
 Bench
 Grinders.



"New Yankee" Drill Grinders.

**THE MOST ADVANCED AND FINEST
 CONSTRUCTED MACHINES EVER
 BUILT FOR THE PURPOSE.**

MADE IN 10 different styles from little bench grinders to large floor machines, grinding drills 5 inches in diameter, meeting every requirement in drill grinding.

ONLY ONE adjustment to grind any sized drill within range of the machine.

Adjustable to grind any amount of clearance desired.

It grinds drills mechanically correct.

SEND FOR CATALOGUE.

WET GRINDER.

Capacity $\frac{1}{8}$ to $3\frac{1}{2}$ in.
 Smaller Holders Interchangeable.

WILMARTH & MORMAN CO.,

Bridge and Canal Streets

- GRAND RAPIDS, MICH.

TO HANG UP IN THE SHOP.

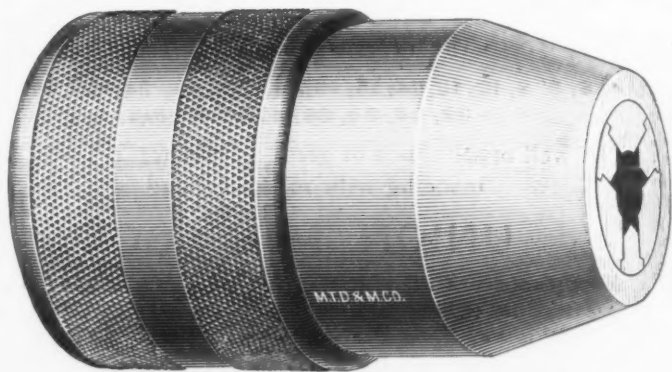
THE METAL WORKER SHOP CARD NO. 3, GIVING TABLE OF DIAMETERS, AREAS AND CIRCUMFERENCES OF CIRCLES. PRICE, 25c.

THE METAL WORKER SHOP CARD NO. 5, GIVING TABLE OF CAPACITY OF CYLINDERS IN UNITED STATES GALLONS. PRICE, 25c.

DAVID WILLIAMS CO., Publishers,

- - - 232-238 William Street, New York.

No. 122.

STETSON PATENT DRILL CHUCK No. 2. **MORSE**
NEW BEDFORD, MASS., U. S. A.,
Manufacturers of

CHUCKS,

BEACH, STETSON AND CENTER DRILL.

With this construction the Jaws move in that part of the Chuck which is attached to the driving spindle. Increased strength is gained to the Chuck by this arrangement. The threaded and working parts of the Chuck are covered and thereby secured from injury or dirt.

No. 2, holding from 0 to $\frac{3}{8}$ inch diameter, \$8.50.

National Heading, Upsetting and Forging Machine.

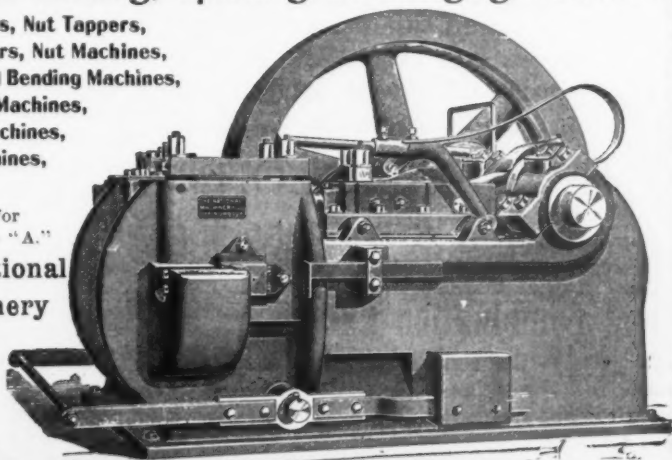
Bolt Cutters, Nut Tappers,
Bolt Pointers, Nut Machines,
Forming and Bending Machines,
Wire Nail Machines,
Washer Machines,
Spike Machines,
Shears.

Send for
Catalogue "A."

The National
Machinery

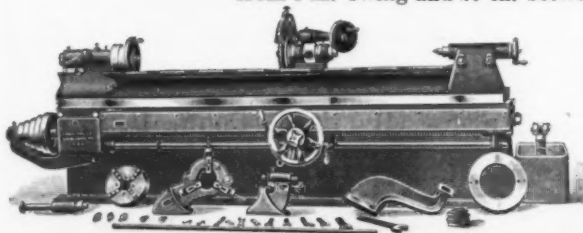
Co.,

TIFFIN,
OHIO,
U. S. A.



ONE OF SIX

Sizes of our **UNIVERSAL GRINDING MACHINES**, ranging from 8 in. swing and 20 in. between centers to 20 in. swing and 144 in. between centers.



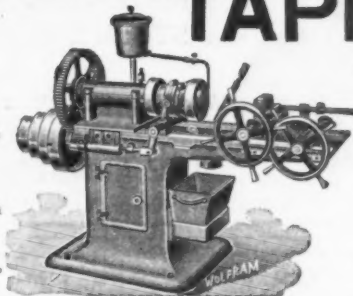
Get Our Catalogue,

LANDIS TOOL CO.,
Waynesboro, Pa.

BOLT HEADERS and NUT TAPPERS.

WRITE TO US FOR
ANYTHING YOU
WANT IN THIS LINE.

EUROPEAN AGENTS:
Schuchardt & Schutte, Berlin
and Vienna.
Adphe. Janssens, Paris.
O. W. Burton, Griffiths & Co.,
London.



The Acme
Machinery Co.,
CLEVELAND, O.,
U. S. A.
Cor. St. Clair and Ham-
ilton Sts.

DRILLS,

COMPLETE LINE;
1 to 6 SPINDLES;
8 in., 10 in., and 14 in. SWING.
D'AMOUR & LITLEDAL CO.,
131 Worth St.
NEW YORK.

Worcester Drill Grinders.

3,000
In Use.

Patented in U. S., England, France, Belgium
and Germany.

Address

Washburn Shops,
Polytechnic Inst.,
WORCESTER,
MASS

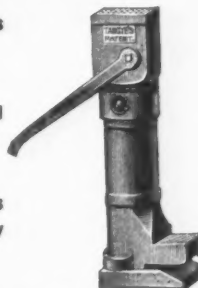


Tangye's Hydraulic Jack.

Sizes from 3 tons
to 200 tons.

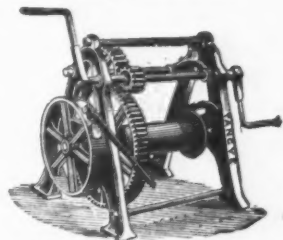
Works horizontal
or perpendicular.

The key lowers
and stops it at any
point.

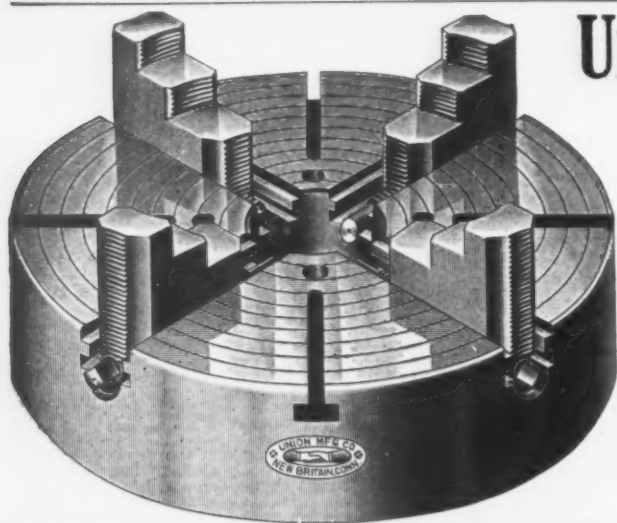


Iron Hoisting Crabs.

Write
for
Prices.



JOS. F. McCOY CO.,
26 WARREN STREET, NEW YORK.



Union Independent Chuck, No. 18.

MADE IN THE FOLLOWING SIZES:

4, 6, 8 9, 10, 12, 14, 15, 16, 18, 20, 22, 24, 26, 28 30,
32, 34, 36, 38, 40, 42 inches.

A well made chuck of great strength, "T" slot commencing with 10 in. size and up.

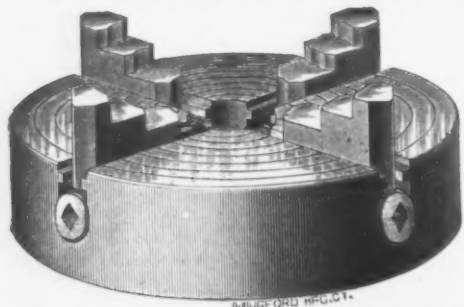
UNION MFG. CO..

Manufacturers of a full line of Independent, Combination Universal Geared, Scroll and Valve Chucks, Face Plate Jaws and Drill Chucks.

Factory, New Britain, Conn.

Warehouse, 103 Chambers St., New York.

CHAMPION INDEPENDENT CHUCKS



An entirely new line of small Chucks, provided with 3 or 4 independent reversible steel jaws. The best Chuck in the market for foot lathes. Ask your dealer for them or write to us.

THE D. E. WHITON MACHINE CO.,

NEW LONDON, CONN.

European Agents, SELIG SONNENTHAL & CO., 85 Queen Victoria St., London.

Our catalogue is free and will give full information.



The Sweetland Combination Chuck,

with patent reversible jaws, is the best all around chuck made. We also make the *Sweetland Geared Scroll Chuck*, the only one with Solid Reversible Jaws. Will furnish the regular one or two sets of jaws if required.

A full line of Combination, Independent, Universal and Scroll Chucks, Face Plate Jaws, etc.

We have the latest and best thing in Self-Opening and Adjustable Screw Cutting Die Heads. Can use either right or left-hand dies. One head will take the place of four of other makes



SEND FOR CIRCULAR.

THE HOGGSON & PETTIS MFG. CO., New Haven, Conn., U. S. A.

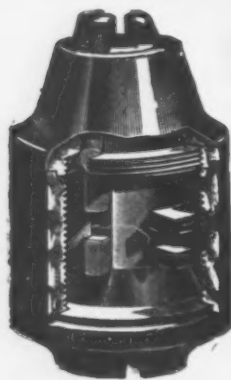


NOTICE.

We have just added a new size to our line of Hartford Drill Chucks: A No. 3, holding to 1 inch diam. Price \$10.00 list. A heavy, powerful chuck designed for the hardest service.

SEND FOR OUR CATALOG OF CHUCKS FOR ALL PURPOSES.

THE CUSHMAN CHUCK CO., - Hartford, Conn., U. S. A.



THE WEIR "MODEL" DRILL CHUCK

Powerful Grip,
Perfectly True.
Send for Catalogue.
DOEBLER MFG. CO
Middletown, Conn.



Skinner Chucks. For LATHES, DRILLS and PLANERS.

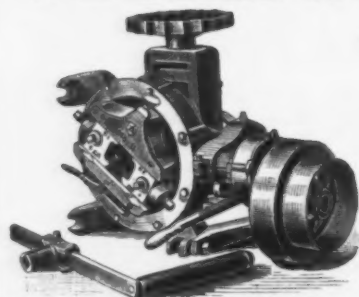
Illustrated Catalog Free.
Skinner Chuck Works,
New Britain, Conn.

WE BUILD A SUPERIOR LINE

of PIPE THREADING,
and CUTTING OFF
MACHINES, (Hand or Power,)
STOCKS, DIES and other Tools

For
WATER, STEAM and GAS FITTERS.

— CATALOGUE —
THE ARMSTRONG MFG. CO.,



No. 0 Threading Machine, Power Attachment.

139 Centre St., New York.

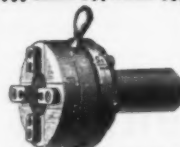
BRIDGEPORT, CONN.

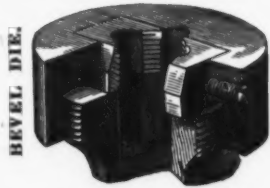
DON'T WASTE GOOD MONEY AND TIME

trying to use those antiquated solid dies on your screw machines or turret lathes when you can save 50% by using our improved Self-Opening and Adjustable Screw-Cutting Die Heads, which are way up to date.

Send for our Catalogue 1 A.

GEOMETRIC DRILL CO., Westville, Conn.





Little Giant.

Screw Plates.

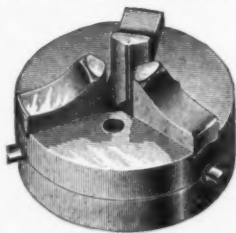
Send for Catalogue giving description of assortments and prices.

WELLS BROS. & CO.,
Greenfield, Mass.

SALES RECORD shows that our "Users' List" of **Peerless and Duplex Pipe Threading and Cutting Machines** is constantly increasing through the addition of new customers' names. It does not stop there by any means! Duplicate orders, or those for larger machines, from customers already of record are a very noticeable feature of our sales. The catalogue we issue is interesting and will be gladly mailed without charge.

BIGNALL & KEELER MFG. CO., Edwardsville, Ills., U. S. A.

Agents: Chas. Churchill & Co., Ltd. London. DeFries & Co., Actiengesellschaft, Düsseldorf. Aktiebolaget Verktygsmaskiner, Stockholm.



74-page Catalogue.

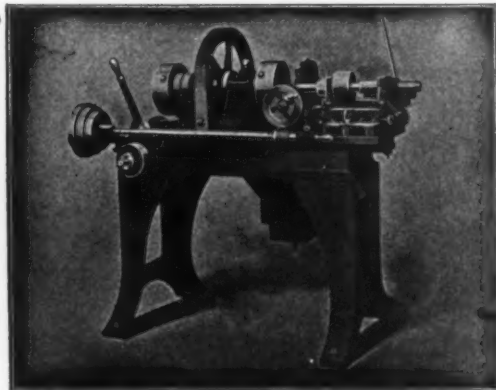
It has ever been the policy of the **HORTON CHUCK CO.** to have all the facilities for doing good work. And not to spare time, machinery, material or other expense to accomplish that end. Our experience in making

CHUCKS

for the last fifty years has proved that this policy is the correct one. Our *Customers* appreciate it.

THE HORTON CHUCK CO., Windsor Locks, Conn., U. S. A.

SCHUCHARDT & SCHUTTE, Berlin, Vienna, Cologne, Stockholm and New York. FENWICK FRERES & Co., Paris, France.
VAN RIETSCHOTEN & HOUWENS, Rotterdam.



2 in. Accelerated Speed Machine.

CUTTING-OFF MACHINES.

The Latest and Best. Send for Circulars

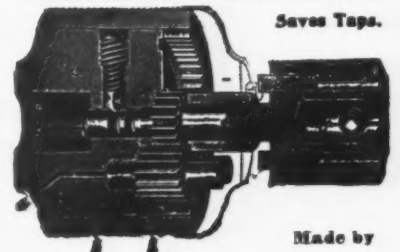
GERMAN AGENTS:
Schuchardt & Schutte, Berlin and Vienna.

ENGLISH AGENTS:
Chas. Churchill & Co., Ltd., London and Birmingham.

Hurlbut-Rogers Machine Co.,
SO. SUDBURY, MASS., U. S. A.

THE IDEAL REVERSING TAP HOLDER.

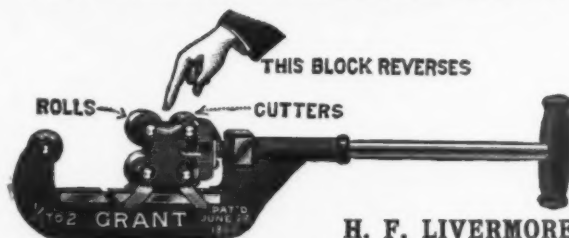
Complete in itself—Very Sensitive, and Saves Taps.



Made by

IDEAL MACHINE WORKS, - Hartford, Conn.
SEND FOR CIRCULAR.

THE GRANT CHANGE PIPE CUTTER



THIS BLOCK REVERSES

ROLLS CUTTERS

ONE IS ENOUGH TO CARRY.
CUTS FROM $\frac{1}{8}$ to 2 IN.

Cuts with 3 cutter wheels, or with 1 cutter wheel and 2 rolls.

Changes Instantly.

Strong, light and simple. Nothing to get out of order.

H. F. LIVERMORE, 85 Pearl St., Boston.

HIGH GRADE WOOD WORKING MACHINERY.

Prices, full particulars and large new illustrated catalog free on application.

Way Swing Saw. "GRAND PRIX," Paris, 1900.

J. A. Fay & Egan Co.
Nos. 179 to 199 W. Front St.,
CINCINNATI, O.

S. A. WOODS MACHINE CO.,

EARL ST.,
SO. BOSTON, MASS., U. S. A.

ESTABLISHED IN 1854.

**WOOD
WORKING
MACHINERY.**

Worth Considering TWO DRILLS,

both used the same length of time.

This held by a

**PRATT
CHUCK**

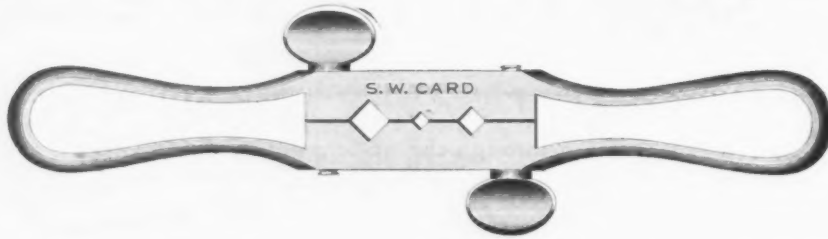


This by other makes.

FREE
BOOKLET.

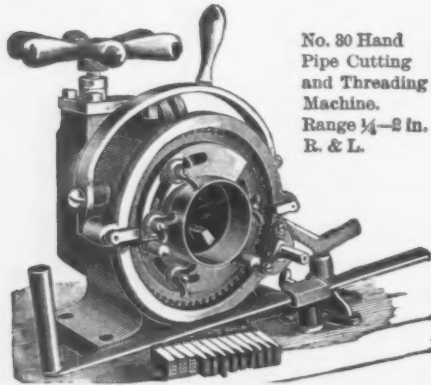
Pratt Chuck Co.,
Frankfort, N.Y., U.S.A.

CARD'S HANDY TAP WRENCH.



THIS IS ONE OF A LARGE FAMILY. CARD HAS A CATALOG.
SHALL WE MAIL YOU ONE?

S. W. CARD MFG. CO., Mansfield, Mass., U. S. A.



No. 80 Hand
Pipe Cutting
and Threading
Machine.
Range $\frac{1}{4}$ —2 in.
R. & L.

THE Curtis & Curtis Co.

No. 15 Garden St., BRIDGEPORT, CONN.

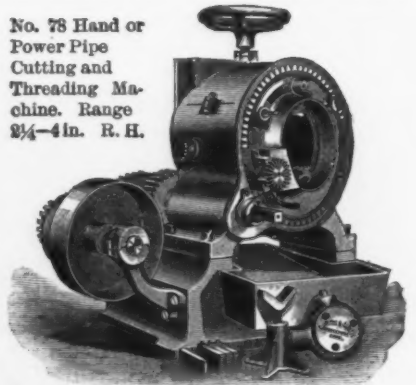
MANUFACTURERS OF

FORBES' PATENT DIE STOCK, FOR HAND OR POWER.

OUR HAND MACHINES are the only portable hand machines in the market with which one man can cut off and thread large pipe up to 12 inches diameter without assistance. Two and three-inch pipe is threaded by using only one hand on the crank, thus saving much time and hard labor.

OUR POWER MACHINES occupy less floor space, require less power to run them, are more simple of construction, and are far cheaper than any other make of machine of the same range in the market.

No. 78 Hand or
Power Pipe
Cutting and
Threading Ma-
chine. Range
 $\frac{3}{4}$ —4 in. R. H.



RATCHET DRILLS, RATCHET DIE STOCKS, MALLEABLE IRON PIPE VISES.

SEND FOR ILLUSTRATED CATALOGUE.



Reliable Torches

For Oil or Gasoline

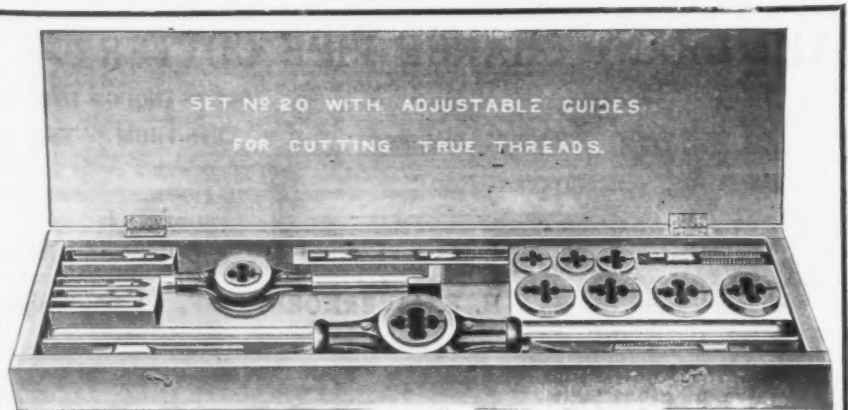
For use in Factories, Foundries, Machine Shops, Rolling Mills, Blacksmith Shops, Warehouses, &c. They make a strong white light, are free from smoke and are not affected by wind or rain.

Can be run at an expense of about one-half cent to one cent per hour, burning a bright, steady light, which is ten times greater than the light of an ordinary gas burner.

Write us for prices.

MANUFACTURED BY

THE SCHNEIDER & TRENKAMP CO.,
Chicago, Ill., and Cleveland, Ohio.



Double Set, Nine Sizes, 1-4 in. to 1 in. inclusive.

The Die That's Used in Our Screw Plates

Is better in many ways than any other. It is the result of twenty-five years' experience with solid, split and chaser dies in screw and bolt cutting machinery, and embodies everything good that we've been able to learn about die making in that time. We warrant this die—The Reece Patent—to do six times as much work as the old die, in the same length of time.

The Reece Die cuts a thread slick and clean, does it at one cut and cuts easier than the first cut with the common die. It leaves no burr raised above the true size.

We have thousands of unsolicited testimonials from pleased users.

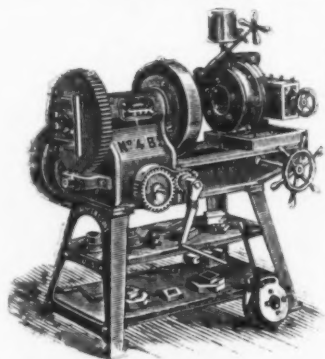
SEND FOR
CATALOG D.

The E. F. Reece Company,

GREENFIELD,
MASS., U. S. A.

D. SAUNDERS' SONS,

MANUFACTURERS OF

**PIPE CUTTING
AND
THREADING MACHINES.**

All sizes $\frac{1}{4}$ inch to 18 inch for Pipe Mill, Gas and Steam Fitters' use. Tapping Machines for Steam-Fittings, also Steam and Gasfitters' Hand Tools.

SEND FOR CATALOGUE.

No. 4 B Machine, $\frac{1}{4}$ to 4 inch.
Hand or Power.

No. 25 Atherton St., Yonkers, N.Y.

RICHARD DUDGEON,

No. 24 Columbia St., New York.

Maker and Patentee of the Improved

Hydraulic Jacks

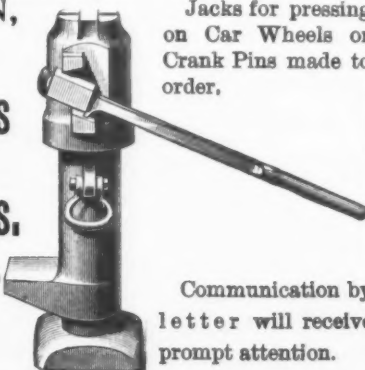
AND

Punches.

Roller Tube Expanders,

and Direct Acting

Steam Hammers.



Jacks for pressing
on Car Wheels or
Crank Pins made to
order.

Communication by
letter will receive
prompt attention.

**HYDRAULIC
JACKS.**

**PRESSES, PUMPS, ACCUMULATORS,
VALVES, GAUGES and FITTINGS, HAND
HYDRAULIC and POWER PUNCHES
and SHEARS.**

THE WATSON-STILLMAN CO.,

204-210 E. 43d St., New York.



CHICAGO BRANCH: 45 Rookery.
CHAS. G. ECKSTEIN, Spandauer Str., 16-17, Berlin, C., Germany.

Send for
Catalogue E.

RELIANCE HYDRAULIC JACKS.

Superior to any Jack
now made.

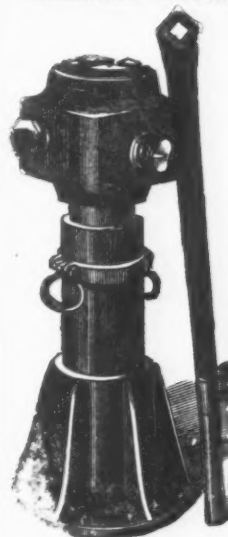
Absolute in its
actions in any posi-
tion.

Under complete
and instantaneous
control.

Made in Four Sizes,
10, 15, 20 and 30
ton capacity, to lift
12 or 18 inches.
Broad Base or
Ground Lift.

**Dienelt &
Eisenhardt,**

MAKERS,

1308 Howard Street,
PHILADELPHIA.**MERRELL**PIPE THREADING
MACHINERY.

We make the best and most complete
line in the world, strength, durability and
efficiency considered. Send for catalogue.

THE MERRELL MFG. CO.,
TOLEDO, O.

EUROPEAN OFFICE:

The Fairbanks Co., 16 Great Eastern St.,
London, E. C., England.

The Chicago Flexible Shaft Co.,

Manufacturers of
Flexible Shafts
under an Im-
proved Process, in-
suring great
strength and in-
creased durability.
Warranted the
Best.

Superior shafts
for all purposes.
Also special and
standard Tools
and Appliances.

We now make
Wire Scratch
Brushes for use
with the Flexible
Shaft that are
giving com-
plete satisfac-
tion.



CHICAGO FLEXIBLE SHAFT CO.,
Nos. 158-160 Huron St., - CHICAGO, ILL.
European Agents: Niles Tool Works Co.,
London, Eng.

SEND FOR CATALOGUE

THE

**Keagy & Lear
Machine Co.,**

COSHOCTON, O.

Manufacturers of Miners' Drilling Machines,
Needles, Tampers and Scrapers, Wedges and
Sledges; also Post Hole Augers, Steel Fence
Posts, Wire Picket Fence. We can quote you
prices that will interest you. Write

Hardening and Tempering

To be done quickly, with perfect
Uniformity and Excellence,

Must be done in Gas Furnaces.

RESULTS UNEQUALED.

American Gas Furnace Co.,

23 John Street, New York.

Chas. Churchill & Co., London and Birmingham; Schu-
hardt & Schutte, Berlin and Vienna; Hermann-
Glaenger & Co., Paris.

**HYDRAULIC
JACKS**

**TUBE EXPANDERS
SCREW PUNCHES
HYDRAULIC PUNCHES
PIPE VICES**

A. L. HENDERER'S SONS
710 MARYLAND AVE. WILMINGTON, DEL. U.S.A.

Lathe and Planer Tools The New Kind
All Sizes

Using inserted SELF-HARDEN-
ING Steel Cutters. Saves For-
ging, Dressing, Tempering, 90%
Tool Steel, 70% Grinding. New
Tools, New Catalog. New Prices.
KEEP POSTED.

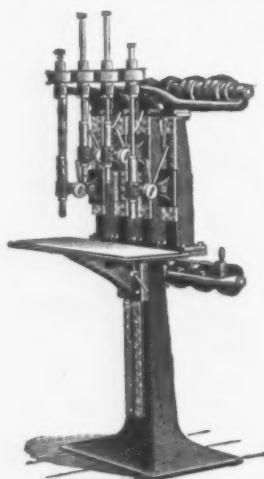
ARMSTRONG BROS. TOOL CO., Chicago, Ill.**Compound Lever and Pinion
Slitting Shear** For Cutting Sheet
Metal.

Every machine shop will save
money by having one or more in
use.
Will cut $\frac{1}{4}$ in. Cast Steel, No. 8
Sheet Iron and No. 6 Hard Brass.
Send for Circular and Price.

C. S. MERSICK & CO.,
Manufacturers, NEW HAVEN CONN.



MULTIPLE SPINDLE Sensitive Drill.

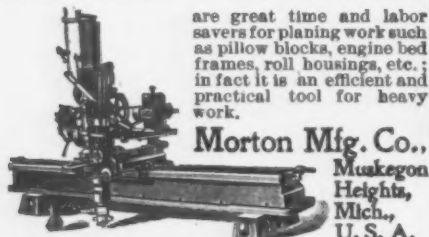


2, 3, 4 and 6 Spindles.

SEND FOR CIRCULAR.

HILL, CLARKE & CO.,
Boston and Chicago.

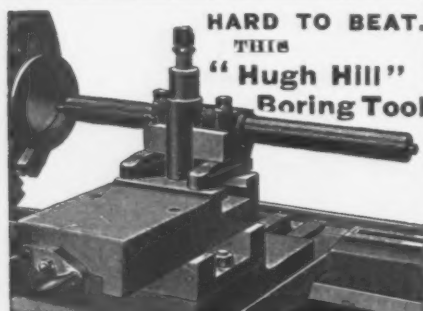
Morton's Portable Planers



are great time and labor savers for planing work such as pillow blocks, engine bed frames, roll housings, etc.; in fact it is an efficient and practical tool for heavy work.

Morton Mfg. Co.,
Muskegon
Heights,
Mich.,
U. S. A.

Eastern Branch: 126 Liberty Street, New York, N. Y.;
Walter H. Foster, Manager. Glasgow Office: 40 St.
Enoch Square; James Ritchie, Manager. Schuchardt
& Schutte, Berlin, Vienna, Brussels, Stockholm and St.
Petersburg. Adphe. Janssens, Paris France. Selig.
Sennenthal & Co., London, England



HARD TO BEAT.
THIS
"Hugh Hill"
Boring Tool

THE MOST SATISFACTORY BORING TOOL MADE.
HILL TOOL CO., - Anderson, Ind.
G. Diechman & Sohn, Berlin, Germany.

NAME PLATES For MACHINERY.

We make name plates for some of the largest makers of machinery in the U. S. and we would be pleased to send you sample and quote price.

No Plate Too Large or Too Small.

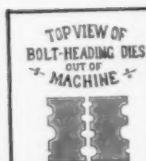
MURDOCK PARLOR GRATE CO.,
154 Boylston St., Boston, Mass., U. S. A.

New Green River SHOEING VISE and BOLT HEADER No. 3.

Send for Descriptive Circular.

Complete for Shoeing and Bolt-heading, \$12.50
For Shoeing only, without Bolt-h'ing attach., 11.50

Wiley & Russell Manfg. Co.,
GREENFIELD, MASS.



JARECKI MFG. CO., - - ERIE, PA. PIPE THREADING AND CUTTING TOOLS OF ALL DESCRIPTIONS.



Malleable and Cast Iron
Fittings.
Brass and Iron Body Valves
and Cocks.
Pipe Threading Tools.

Write for Catalogue showing the most complete line of 1/4-inch to 16-inch for hand, belt, engine and with electric motor attachment.
We can furnish Bolt Threading Attachment for this Machine.

THE W. P. DAVIS MACHINE CO.,

BUILDERS OF FINE

Engine Lathes,

From 10 to 30 inch swing.

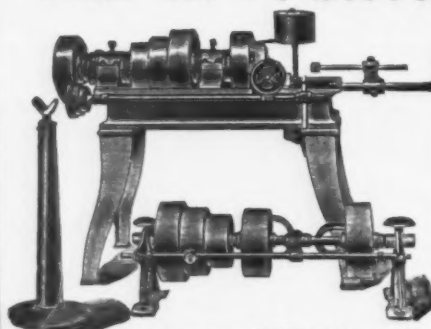
Upright Drills,

From 10 inch Sensitive to 36 inch, with B. G. and P. F.

— ALSO —

Keyseating and Cutting-off Machines

ROCHESTER, N. Y., U. S. A.



3 in. Cut Off Machine.

Send for Circulars and Photographs.

"THE STANDARD" SCALES,

FOR RAILROADS, MINES, MILLS, WAREHOUSES
AND ALL PURPOSES.

Used by U. S. Government, Leading Railroads and Manufacturers.

THE STANDARD SCALE AND SUPPLY CO., Limited,
Manufacturers, --- PITTSBURGH, PA.



THE RICHARD MANUFACTURING CO.,

Manufacturers of

DRAW BENCHES & SPECIAL MACHINERY

For Tubing and Sheet Metal.

— DIES A SPECIALTY —

BLOOMSBURG

PENNA.

The Champion Steel Blacksmith Blower.

Made with Ball Bearings Only.

Patented and Patents Applied for.

WE GUARANTEE

The Champion Steel Blowers and Steel Forges to produce a blast equal to a Blower run by power with one-fourth the labor required to operate any other Hand Blower Forge or Bellows. TRY THEM—if not found as represented we pay all expenses for their return to our Works. Can anyone afford to pass the above proposition; word that never were or could be printed before the Champion Steel Blowers and Forges were built?

The No. 400 line of Champion Steel Blacksmith Blowers and Forges for producing blast for Blacksmith Fires are unquestionably the marvel of the age. Their valuable features are the realization of hopes of past generations, viz: a strong, regular and positive blast equal in every respect to a blast produced from a Blower run by power. Before the invention of the Champion Steel Blowers and Forges this broad claim was never made for Hand Blower or Forge. This wonderful blast, in connection with the astonishing ease for operating, is so successfully accomplished only by the simple and ingenious three-piece mechanical construction, which gives the Blower a positive drive, and at a far higher speed than human hand was able to accomplish heretofore, and this with one-fourth the labor for operating. The machinery is all made from the best of tool steel and phosphor bronze; machined and cut from the solid metal and fitted with the precision and nicety of a watch, and all enclosed in an oil-tight casing. It has no belts or friction, and is fitted up all through with Ball Bearings. The Blower is very compact; takes less room for setting up than any other; can be taken apart for transportation and again set up in a very few moments. It has an adjustment whereby it can be raised or lowered to suit the height of all size mechanics. The blast is produced by turning the crank either direction. These Blowers and Forges are placed before the world guaranteed to produce a blast equal to the best blast that can be produced by a Blower run by power, and we recommend them in our strongest terms for all purposes; in fact, no fire run by hand should be without them.

Write for our 192-page catalogue, illustrating the largest and most complete line of Blowers, Forges, Blacksmith Drills, Tire Shrinkers and Benders, Screw Plates, Power Blowers, &c., &c., under one management in the world.

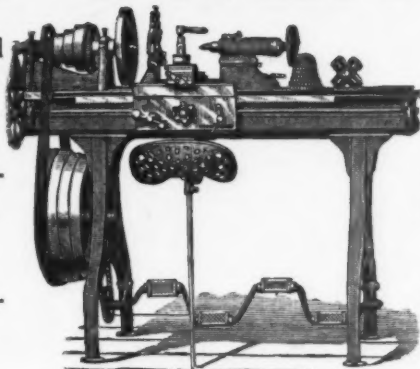
CHAMPION BLOWER AND FORGE CO., Lancaster, Pa., U. S. A.

FOOT POWER LATHES

Built for Experimental and Electrical Work.

Cycle Repair and General Machine Shop Work.

Tool Makers and Gunsmiths.



Lathes furnished with Stand-up Treadle or Countershaft if preferred.

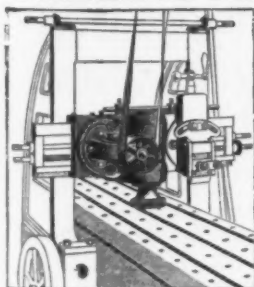
Our Screw-Cutting Lathes have a hollow spindle; set-over tail stock; tool carriage adapted for taper-boring and turning. Workmanship and material are of the very best. Our lathes are strong and practical tools and built for business.

Send for Catalogue and Prices.

W. F. AND JOHN BARNES CO.,

69 RUBY ST., ROCKFORD, ILL.

MILLING MACHINE



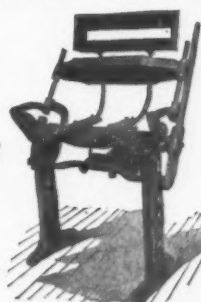
Combined with any IRON PLANER

Swivels from horizontal to vertical. Do not plane surfaces that should be milled, or mill surfaces that should be planed.

SEND FOR CATALOGUE.

The Adams Company, Dubuque, Iowa.

MOLDING MACHINES.



Send for

Catalogue.

The Adams Company, Dubuque, Iowa.

Bradley



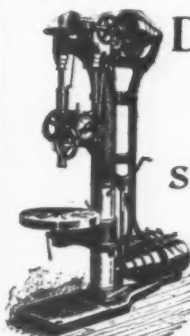
Hammers.

Guaranteed to produce 25% more work with less cost for power and repairs than any other make of power hammers in the world. Send for circulars.

THE BRADLEY COMPANY, SYRACUSE, N. Y.

FOREIGN AGENTS:
Schuchardt & Schutte, Berlin, Cologne, Vienna, Brussels, Stockholm, St. Petersburg.
Buck & Hickman, Whitechapel Road, London.
Montgomery & Co., 23 Boulevard Magenta, Paris.

New 24, 26 and 28 inch



DRILL,

with back gears, self-feed, quick return, automatic stop, graduated quill and reverse motion.

Sibley & Ware, South Bend, Ind. 150 E. Tutt St.

New York agents for export, Markt & Co., Ltd., 188 West Street, Hamburg; 3 Pickhuben, London; 25 and 26 Shoe Lane, Holborn Circus, E. C. Paris: 175 Rue du Temple.

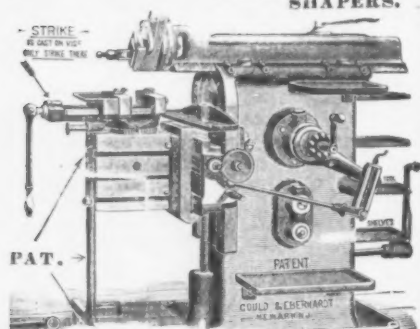
Taps and Dies.

BUTTERFIELD & CO., DERBY LINE, VT. ROCK ISLAND, CAN.

Patent **EXTENSION BASE**

TRADE-MARK.

SHAPERS.



"Double-Triple Quick Stroke" (Trade-Mark)
Gives 100 per cent. more strokes per minute than any other
Shaper made. Write for our Shaper Catalogue.
Gould & Eberhardt, Newark, N. J., U. S. A.

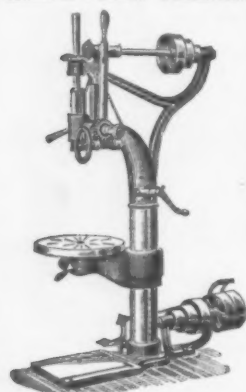
Agents: Manning, Maxwell & Moore, New York.
U. Bald Mach'y Co., Pittsburgh, Pa.
Marshall & Huschart Mch'y. Co., Chgo., Cleve., Cin.
Schuchardt & Schutte, Berlin, Cologne, Vienna
Brussels, Stockholm, St. Petersburg.
John Lang & Son, Johnstone, Scotland, and England
Roux, Freres & Co., Paris, France.
Selig, Sonenthal & Co., London, England.
White, Child & Beney, Shapers and Dr. Presses
Vienna.

DRILLS

TO DRILL HOLES.

\$6 to \$85.

3 sizes "Advance" Drills, Nos. 12, 13 and 14
Hand or Power. 4 sizes Silver's Drills, Nos. 1, 2, 3, 4



20 In. Power Drill.
Square Base, Lever
and Screw Feed.

Price, - \$85.00.

Every Drill Guaranteed.

THE SILVER MFG. CO.,
317 Broadway, Salem, Ohio.

We manufacture a complete line of

DRILLS

for light work, one or more spindles,
hand or automatic feed, of thorough
workmanship and strictly up to date.

Prompt Delivery on Regular Styles.
NEW CATALOGUE ON APPLICATION.

Dwight Slate Machine Co.,
HARTFORD, CONN.

CHAS. LEFFLER & CO.,

49-61 Clymer St., Brooklyn, N.Y.

PRESSES, DIES and TOOLS

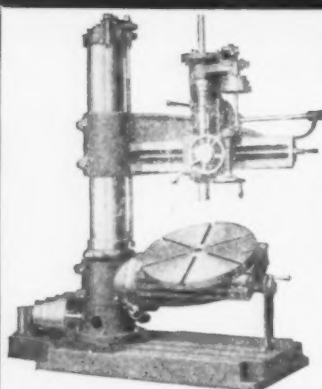
FOR THE

Manufacture of Sheet Metal and Paper Goods.
Special Machinery, Experimental Machinery
Metal-Edge Paper Box Machinery, Etc.

GENERAL MACHINERY

For Petroleum Cans, Powder Cans, Fruit Cans
Sardine Boxes, etc., etc., etc.

Telephone, 753 W'msb'gh.



FOR LIGHT AND MEDIUM MANUFACTURING

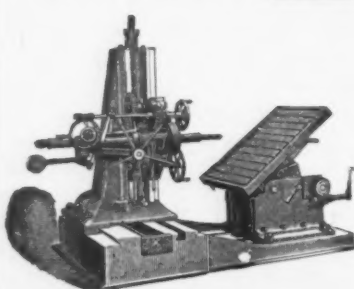
the Bickford No. 0 Radial has many advantages over every other machine of its class—advantages that you'll acknowledge the minute they're explained to you.

Our **RED BOOK**
explains these features fully
and it's free for the asking.

THE BICKFORD DRILL & TOOL CO.,
Cincinnati, Ohio, U. S. A.

Foreign Agents: Schuchardt & Schutte, Berlin, Vienna, Cologne, Brussels, Stockholm, St. Petersburg, Charles Churchill & Co., Ltd., London, Birmingham, Manchester and Glasgow. Adolphe Janssens, Paris and Brussels. F. W. Horne, Yokohama, Japan. Julio Collignon & Co., Guadalajara, Mexico.

UNIVERSAL HORIZONTAL DRILL.



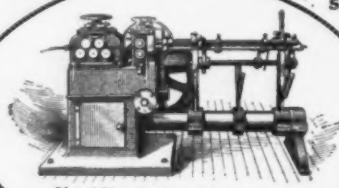
40 inch horizontal by 40 inch
vertical movement. Five sides of
a cube can be drilled at any angle
without re-chucking the work.
Write for further particulars.

The Detrick & Harvey Machine Co.,
BALTIMORE, MD.

—THE— F. B. SHUSTER CO., New Haven, Conn.

We Manufacture ...
**SPECIAL AUTOMATIC
MACHINERY AND TOOLS**

For Manufacturers of
Electric Goods, Elevator Guards, Fancy Metal Goods, Fishing Tackles, Fly Screens, Furnaces and Ranges, Furniture Hardware, General Hardware, Gas Fixtures, Galvanized Iron and Copper Cornices, Garden Tools.

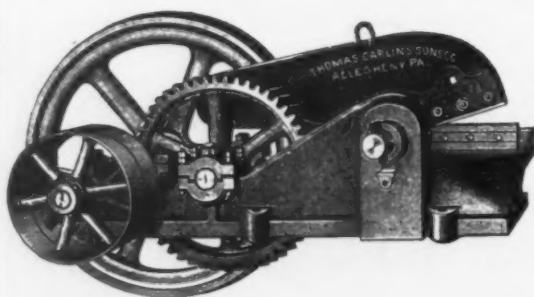


Sheet Metal Straightener and
Cutter, No. 2.

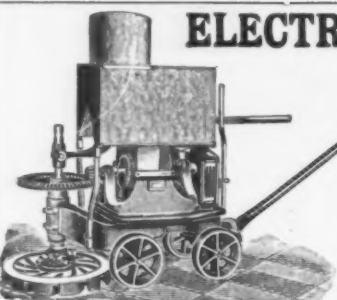
Send for New Catalogue D.

Iron and Steel, Kitchen Utensils, Jewelry, Loom Harness, Jacquards, Metal Ceilings, Metal Goods, Paper Boxes, Saddlery Hardware, Sewing Machines, Silver Plated Ware, Stoves, Surgical Instruments, Tinware, Toys, Toy Wheelbarrows, Typewriting Machines, Velocipedes, Ventilators, Wire Wheels.

Thomas Carlin's Sons Company, ALLEGHENY, PA.



Manufacturers of
**Shears,
Grinding Pans
and Contractors'
Machinery.**



ELECTRIC SURFACING MACHINE

For Smoothing Marble and Mosaic Floors.

For sanding wood floors, also useful for grinding
decks by means of emery discs.
All kinds of stone working and handling machinery, including

Circular and Straight Planing and Moulding Machines

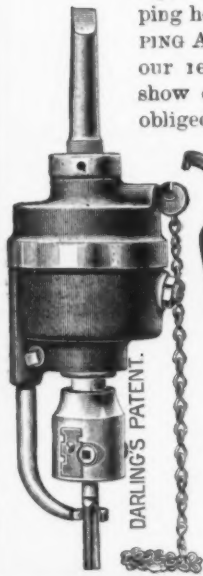
Gang Saws of every capacity, Rubbing Beds from 4 to
18 feet in diameter, Tile and Mosaic Machinery, Polishing
Machines for Marble and Granite, Turning Lathes for Stones.

TRAVELING CRANES FOR ALL PURPOSES.

SEND FOR CATALOGUE

F. R. PATCH MFG. CO., Rutland, Vt., U. S. A.

60 Hours to 3 Hours



represents the difference in time between tapping holes by hand and using a "STAR" TAPPING ATTACHMENT on a small job by one of our recent customers. A larger job would show even a greater difference. You are not obliged to use the "STAR" TAPPING ATTACHMENT every hour to make it pay. The "STAR" TAPPING ATTACHMENT is suitable for Drilling, Tapping and Stud Setting. Automatic. Fits any Drill Press. No Reverse Belts required. Friction and Positive Drive. Chuck securely holds any drill, tap, etc.

No. 1 Taps 1-16 to 5-8 inch.

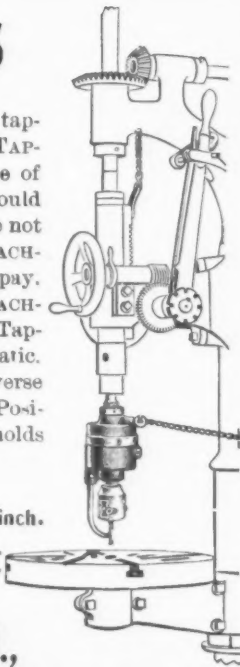
No. 2 Taps 1-16 to 1 inch.

FULLY GUARANTEED--Sent on 30 days' trial.

Circular "D" tells all about the "Star" Tapping Attachment. Shall we send it?

SENECA FALLS MFG. CO.,

255 Water St., Seneca Falls, N. Y., U. S. A.



We Manufacture

Blowers, Exhausters, Heaters, Engines Heating, Ventilating, and Drying Apparatus, Mechanical Draft, Dry Kilns, etc. Correspondence solicited.

NEW YORK BLOWER CO.,
Bucyrus, O., U. S. A.

New York Office, 39 and 41 Cortlandt St., New York.
Chicago Office, Merchants' Loan and Trust Building.

PRESSES



and other Machinery for Working Sheet Metals.

Special Machines Designed and built.

Testing Machines.

The Best Material and Workmanship.

PHILADELPHIA MACHINE TOOL CO.,

445 No. Darien St., Philadelphia, U. S. A.

SMOOTH-ON CASTINGS.

An iron cement for repairing blemishes or blowholes in iron or steel castings. When hard this cement has the same color and appearance as cast iron and will withstand a red heat, steam, water or oil. Write for catalogue and prices.

SMOOTH-ON MFG. CO.,

549-551 Communipaw Avenue,

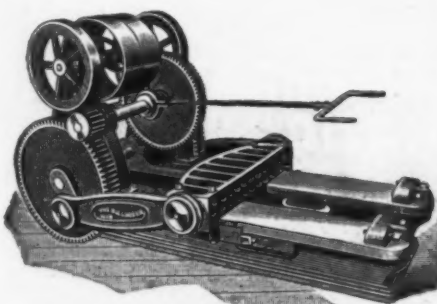
JERSEY CITY, N. J.

VREELAND TOMPKINS, Chemist and Manager.

LATHES, SHAPERS, MONITORS.

SEND FOR CIRCULARS.

THE
Barker & Chard Mch. Tool Co.,
Cincinnati, O.



The **Bulldozer** TRADE MARK

Justice Dead Stroke Hammers,
Riveting Hammers,
Board and Crank Lift Drop Hammers,
Eye Bending Machines,
Eccentric Rolls for Tapering, Disc Plating, &c
Tire Welding Hammers and Presses,
Yeakley Vacuum Hammers.

WILLIAMS WHITE & CO. Moline Ills. U. S. A

Beaudry Champion Power Hammer.



BEYOND COMPARISON.

Simplest, Best Design.
Most Efficient and Durable.

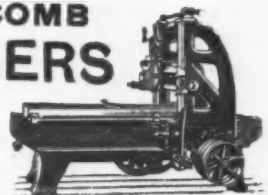
SEND FOR CIRCULAR.

Beaudry & Co., 6 Oliver St.,
Boston, Mass.,
U. S. A.

WHITCOMB PLANERS

Send for Price.

WHITCOMB MFG. CO.,
Worcester, Mass.



THE Scranton POWER HAMMERS

possess *all* the good features other hammers have and *many* good features other hammers haven't.

Send for circular No. 25.

THE SCRANTON & CO.,
NEW HAVEN, CONN.

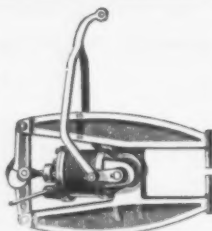
Prentiss Tool & Supply Co., New York.
Marshall & Huschart Machinery Co.,
Chicago, Ill., and Cleveland, O.
Chandler & Farquhar, Boston, Mass.
J. W. Wright & Co., St. Louis, Mo.
Chas. Churchill & Co., Ltd., London, Eng.

Riveters,

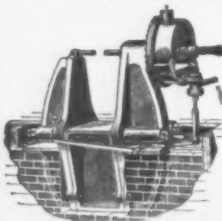
STEAM

OR

PNEUMATIC.



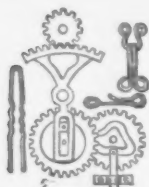
Bethlehem Foundry & Machine Co.,
SOUTH BETHLEHEM, PA.



STATIONARY
OR
PORTABLE.

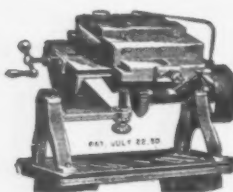
Send for
Catalogue.

DIES **PRESSES** AND
MACHINES FOR WORKING
BAR, PLATE AND SHEET METAL.
FLAT DISC GRINDERS.
RUDOLPHI & KRUMMEL, CHICAGO, ILLS.



AUTOMATIC MACHINERY

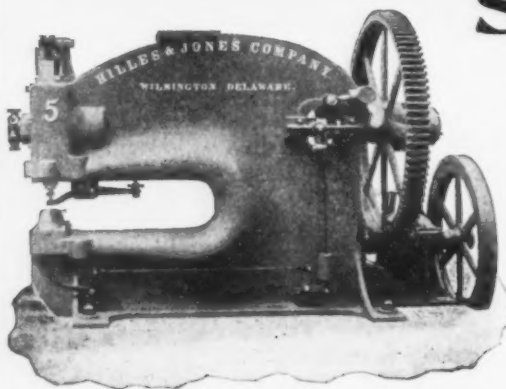
FOR
WIRE and METAL Goods.
Years of successful experience.
Send sample for estimates.
Small wire goods manufactured
to order.
THE PARK CITY MFG. CO.,
Bridgeport, Conn.



THURSTON
Inverted
MILLING
MACHINE.

Send for circular
"A."

Thurston Mfg. Co.
Providence, R. I.

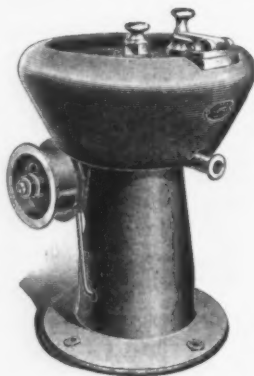


Standard Punches or Shears.

THE accompanying cut is from one of the Hilles & Jones Improved deep-throat punching or shearing machines, which are built in a variety of sizes to cover all requirements. An adjustable automatic stop brings the sliding head to rest at any desired point above the plate. The metal in the main casting has been placed to the best advantage, and the machines are substantial and convenient in every detail.

HILLES & JONES COMPANY, - WILMINGTON, DELAWARE.

Here is an



Oil Extractor FOR \$50.

F. O. B. YOUR CITY.

It is all right for a small shop. If you have but one or two machines it will pay you.

WRITE FOR CATALOG B.

Reed & Curtis Machine Screw Co.,
WORCESTER, MASS.

LATHES.

ISRAEL H. JOHNSON, JR., & CO., - PHILADELPHIA.

**Lathes,
Punches
and
Shears.**

Send for Circulars.

W. C. YOUNG MFG. CO.,

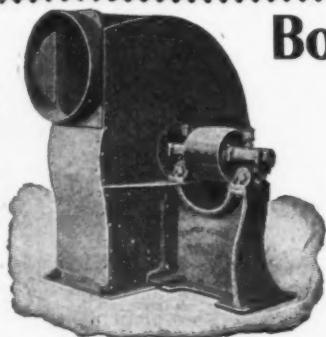
17 HERMON ST.,
Worcester, Mass., U. S. A.

Telegraph Address: YOUNG WORCESTER.

Western Union Code.

IF YOU WANT ANYTHING IN THE LINE OF
**DROP PRESSES · DROP HAMMERS ·
STAMPS OR AUTOMATIC
DROP LIFTERS**
SEND FOR CATALOGUE TO

Miner & Peck Mfg. Co.
New Haven, Conn.
LARGEST LINE IN THE MARKET.



Boston Blower Co.,

FAN AND PRESSURE BLOWERS,
EXHAUST FANS,

•••••FOR ALL USES.

Hot Blast Heating Apparatus,
Dry Kiln Outfits,
Steam Fans, Forges,
High and Low Pressure Engines.

Glenwood and Busner Sts., HYDE PARK, MASS.

NEW YORK OFFICE: 39 Cortlandt St.

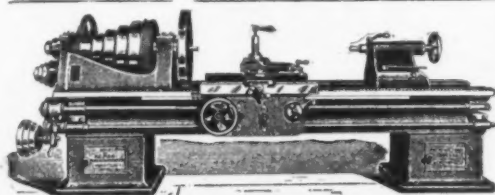
SEND FOR CIRCULARS.

We
Build
by
Contract

MACHINES, MACHINE PARTS, Also BRASS CASTINGS

Everything done right. Send for estimates.

J. B. CHAPMAN & CO., - Springfield, Mass.



Engine Lathes, 20 in. to 38 in.
Gap Lathes, - 20 in. to 38 in.
Heavy Turret Lathes, 16 in., 18 in.
& 28 in. Radial Drills, 4 ft. arm.

H. C. FISH MACHINE WORKS,
WORCESTER, MASS., - U. S. A.



EXETER VENTILATING FANS

will move a larger volume of air with less power required and are lower in price than any fan in the market. We fully guarantee every one to do all we claim and will send one on trial to any responsible party.

SEND FOR CIRCULAR AND PRICE-LIST.

EXETER MACHINE WORKS,
EXETER, N. H. BOSTON, MASS.

RIVET MACHINES

FOR MAKING RIVETS, BOLTS, SCREW
BLANKS AUTOMATICALLY. MACHINES FOR
ROLLING THREADS BY COLD PRESSURE.

NOTE.—With inquiries please send sample of
article to be manufactured to enable us to
recommend the right type and size of machine
for doing the work.

We will send free upon application any of our
illustrated catalogues on the following subjects.

A—Machines for making rivets automatically;
thread rolling machines. B—Machinery for
manufacturing hinges and butts from sheet steel
and brass. C—Cartridge machinery for manu-
facturing metallic cases, bullets, paper shells.
D—Drop Presses, Foot Presses; Forging Drops.
E—Chain Draw Benches for drawing brass and
steel tubing and rods. H—Hydraulic Presses,
Draw Benches, Accumulators, Power Pumps.
L—Lathes for burnishing, knurling, trimming
and spinning sheet metal. M—Open-Back
Single-Acting Power Presses; Automatic Feeds.
N—Blanking and Drawing Presses; Arch and
Pillar patterns. P—Double-Acting Power
Presses; Crank, Cam and Toggle Action Presses.
R—Rolling Mills for rolling sheet brass, copper,
steel, silver, tin-foil, etc. S—Shear Presses,
Single-Slitters, Gang Slitters, Trimming Ma-
chines. T—Standard machines for finishing
sheet brass, German silver, etc. W—Special
Machinery.

Address THE WATERBURY
FAHREL FOUNDRY & MACHINE CO.,
WATERBURY, CONN., U. S. A.

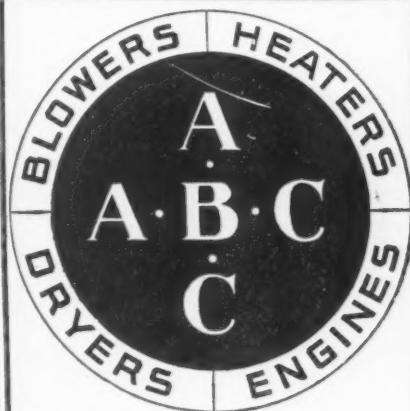
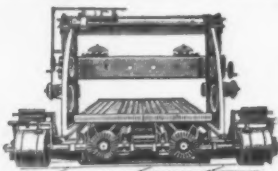
STONE CUTTING AND SAWING MACHINERY

J. Gilmour's Patent.

Saw Dogs, Shaftings, Planers, Rubbing Beds,
Hoisting Machines, both Steam and Belt Power,
Cranes, Diamond Saws, Derricks, Block Cars,
Tile Machinery.

J. GILMOUR, MANUFACTURERS' AGENT
Bennett Building, Nassau and Fulton Sts., New York.

Telephone 4090 Cortlandt.



We Can Solve

your

Heating,
Ventilating,
Drying,
Mechanical
Draft
problems.

Write us.

American Blower Co.,
DETROIT, MICH.

NEW YORK, - - - 141 Broadway.
CHICAGO, - - - 1550 Marquette Bldg.
LONDON, - - - 70 Gracechurch St.

BENCH DRILL

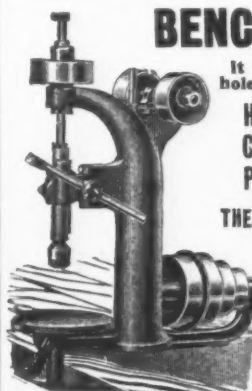
It will drill a 1/4-inch
hole easy.

HAND DRILLS.
CLAMP DRILLS.
PLANNER CHUCKS.

THE Geo. Burnham Co.

15 Hermon St.,
Worcester, - Mass.

Foreign Agents:
C. W. Burton Griff-
ith & Co., London;
Josef Schvartz & Co.,
Budapest; V. Lowe-
ner, Copenhagen



A NEW WATCHMAN'S REGISTER, A NEW EMPLOYEE'S REGISTER, TWO IN ONE.



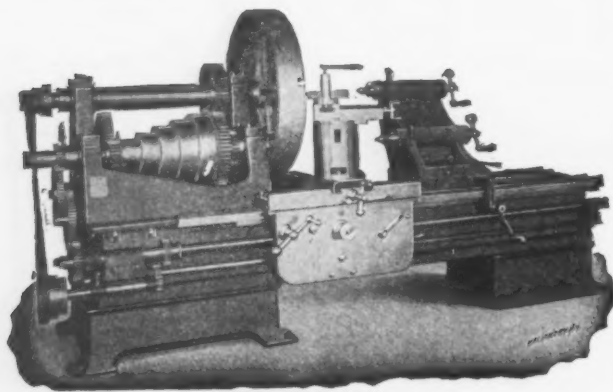
No wires, dials, ribbons, pneumatic tubes
nor batteries. Simple, durable, inexpensive
and absolutely tamper-proof.
Adapted to all situations—shops, yards, tun-
nels, bridges, track repairs, &c.

A Register as good as any at one-
third the price. Send for Circular.

CLEVELAND REGISTER CO., Oberlin, Ohio.

CARTER & HAKES, MILLING MACHINES Shops: Winsted, Conn.
and Vises. Send for Descriptive circulars.

TWO IN ONE.



Don't have to take up shop room with a lathe for regular work and another heavy lathe for occasional work if you have a

McCabe Patent Double Spindle Lathe

which combines two complete lathes in one. It has a 26 in. swing, Back geared 11 to 1, for common range of work, and 44 in. swing, Triple geared 22 to 1, or with Geared Face-plate 66 to 1, for the heavier class of work up to the full swing.

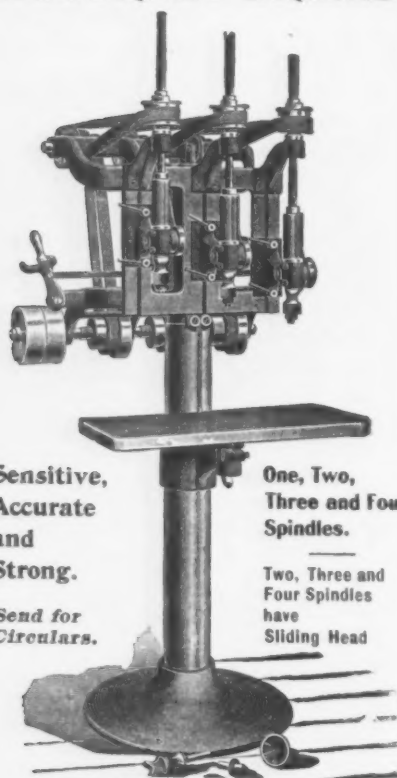
Adapted for all classes of work both large and small and costs but little more than an ordinary medium size lathe.

Send for Catalog and see the list of shops that have them.

J. J. McCABE.

14 Dey Street, New York.

SIGOURNEY DRILLS.



Sensitive,
Accurate
and
Strong.

Send for
Circulars.

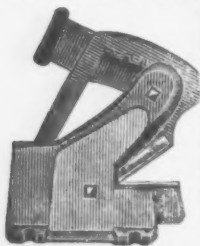
One, Two,
Three and Four
Spindles.

Two, Three and
Four Spindles
have
Sliding Head

ENLARGED FACILITIES

and EQUIPMENT now enable us to fill orders promptly. Also to offer INVENTORS, ENGINEERS and those having inventions or improvements in machines or appliances our mechanical skill and experience in bringing them to commercial success. Contract or day work. Highest standard of workmanship. THE SIGOURNEY TOOL CO., Hartford, Conn., U. S. A.

BICKNELL'S IMPROVED SHEAR



is acknowledged by all users of tools to be the handiest Shear on the market.

We manufacture Punches and Shears for all purposes at reasonable prices. Correspondence solicited.

The Bicknell Hardware Co.,
1465 W. Milwaukee St.,
Janesville, Wis.

AUTOMATIC MACHINERY

for making Wood-Screws, Rivets, Stove and Tire Bolts, etc., also Special Machinery to order.

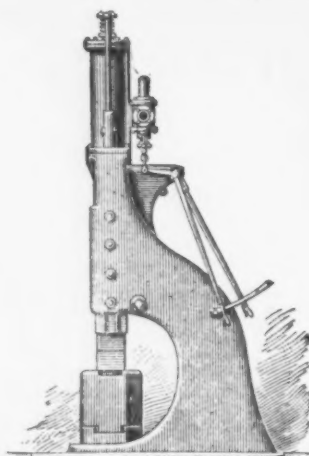
ASA S. COOK CO.,
HUYSHOPE ST., HARTFORD, CONN.

NAME PLATES

For MACHINERY, LATHE INDEXES, MOTORS, PUMPS, PRESSES, etc.

Also METAL ENGRAVERS.

Write for Estimates
BECKER NAME PLATE COMPANY
31 Oliver St.
Boston, Mass.



STEAM HAMMERS OF EVERY DESCRIPTION.

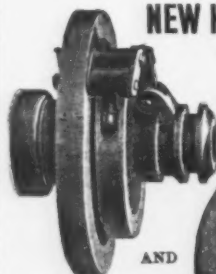
Pittsburgh Shear Knife & Machine Co.,
47th Street and A. V. Ry., Pittsburgh Pa.

NEW HAVEN MFG. CO.,

New Haven, Conn.

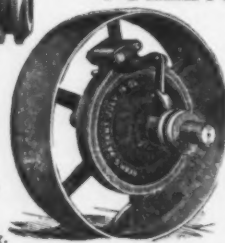
MANUFACTURERS OF

FRICTION PULLEYS



CUT OFF COUPLINGS.

Chas. Churchill & Co.,
Ltd., Agents,
London, Eng.



PRESSES, DIES AND OTHER
SHEET-METAL TOOLS
FERRACUTE MACHINE CO.
BRIDGETON, N.J.

See large adv. next week.

BOSTON GEAR WORKS

Purchase and Pearl Sts., Boston, Mass.

HEADQUARTERS FOR GEARS.

Bevel Gears with Planed Teeth Job Gear Cutting of all kinds Spur, Bevel, Spiral, Ratchet, Worm, Rack, Elliptic, Index Plates, &c. Very small or large. Send for Gear Catalogue H. 3200 sizes of Gears.



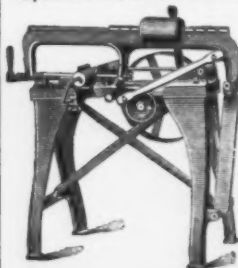
BENNETT OILER.

Self Closing.

Meets every requirement for a device of this kind. Neat, convenient and easily applied. Made in seven sizes, varying by 1-16 in. from 1-4 in. to 5-8 in. \$3.00 per hundred Patent applied for. Samples Free. Send for Discount.

19 Hermon St.,
Bay State Stamping Co., Worcester, Mass.

Drill Presses, Bicycle Machinery, Power Hack Saws, Saw Blades and Drill Chucks, Furniture Spring Machinery. Special Iron, Wire and Wood Working Machinery.



Designed and Built to Order.

Manufactured by
HOEFER MFG. CO.,
Successors to
Stover Novelty Works,
Freeport, Ill., U. S. A.

Foreign Agents:
Schuchardt & Schutte,
Berlin, Cologne, Vienna, Brussels and Stockholm. C. W. Burton-Griffiths & Co., London. W. Hummel fils, Chaux-de-Fonds Switzerland.

PERKINS POWER PRESSES.

The strongest made.
Send for Catalogue.

Perkins Machine Co., BOSTON, MASS., U. S. A.

SCREW MACHINE PRODUCTS
SEND SAMPLES FOR ESTIMATES
DODGE MACHINE SCREW CO. BOSTON, MASS.

ENGINE LATHES

18 TO 32 IN. SWING.
SCHUMACHER & BOYE,
CINCINNATI, O., U. S. A.

Agents, MANNING, MAXWELL & MOORE,
New York, Chicago, Cleveland and Pittsburgh.

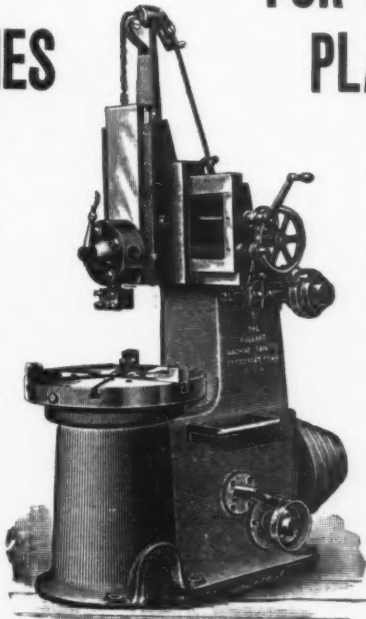
**SUPERIOR
TO LATHES**

We have a
large stock
for prompt
shipment.

Every
Manufacturer
In America
should send
for our
Catalogue
A.

**BULLARD
MACHINE
TOOL CO.,**

**FOR FACE
PLATE WORK.**



30 In. Turret Mill.
(Weight 4500 lbs.)

On exhibition in
the warerooms of
Marshall & Husehart
Machinery Co., Chi-
cago, Cleveland and
Cincinnati. Schue-
hardt & Schutte, Ber-
lin, Vienna, Cologne,
Stockholm and St.
Petersburg. Adolphe
Janssens, Paris.
Charles Churchill &
Co., Ltd., London.
Birmingham, Man-
chester and Glas-
gow.

Ask for Catalogue A.
By mail, free.

**BRIDGEPORT,
CONN., U. S. A**

**WILSON IMPROVED IRON
PLANERS.**
STANDARD SIZES. W. A. WILSON
KEPT IN STOCK. RIVER ST. ROCHESTER, N. Y.

**QUINT'S
TURRET DRILLS**

**MILLING MACHINES AND
TAPPING MACHINES.**

Send for Catalogue.

A. D. QUINT, Mfr.
Clinton St., HARTFORD, CONN.

Die Slotting Machines

For All Die Work.

**Straight and Taper Key Seating and
Internal Gearing Cutting.**

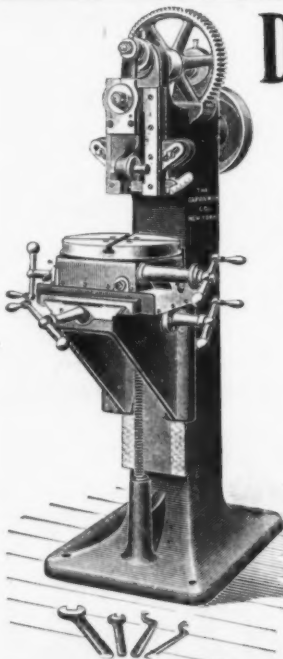
**Two Cross Motions and a Rotary
Table Provided for Follow-
ing any Outline.**

SEND FOR SPECIAL CIRCULAR.

THE GARVIN MACHINE CO.,

Spring and Varick Sts., New York.

SALES AGENTS: The Garvin Machine Co., 51 North Seventh St., Philadel-
phia, Pa. Manning, Maxwell & Moore, 22 South Canal St., Chicago, Ill.
Deutsche Garvin Maschinen-Fabrik Aktiengesellschaft, 17 Burg
Strasse, Berlin, C. Germany. C. W. Burton, Griffiths & Co., Ludgate
Square, Ludgate Hill, London, E. C., England. Montgomery & CO.,
28 Boulevard Magenta, Paris, France.



No. 2 ARCH DOUBLE CRANK PRESS.

**Special
and
Automatic
Machinery
and Power
Presses**

for all purposes, of
practically perfect
proportions and
highest efficiency.
Built on honor and
sold right.

W. H. HIBBARD,
83 Washington St.,
BROOKLYN, N. Y.

**FIVE OPERATIONS,
ONE HANDLING,
Saving 50%
OVER FOOT
PRESS.**

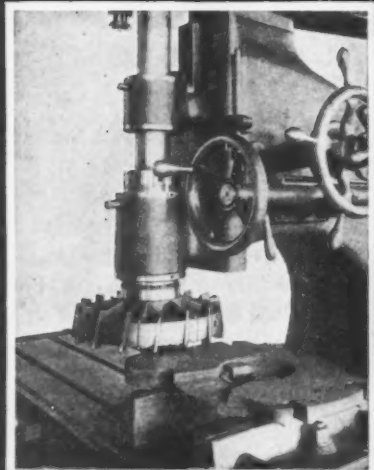
**CROSS
&
SPEIRS
MA. CO.,**

Waterbury,
Conn.



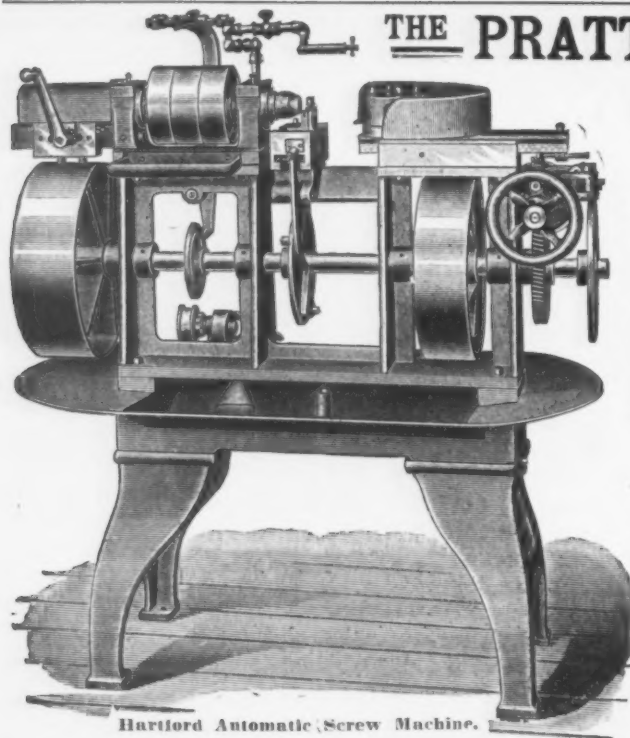
CHILD'S
FINGERS
SAFE.

**SURFACING
ON A
BECKER
VERTICAL
MILLER
IS DONE IN
 $\frac{1}{3}$
THE TIME
REQUIRED
ON A PLANER.**



Furthermore
the surface is
practically true
and therefore re-
quires only one-
third the time for
scraping

**BECKER-BRAINARD
MILLING MACHINE CO.**
HYDE PARK, MASS.



Hartford Automatic Screw Machine.

THE PRATT & WHITNEY COMPANY,

HIGH CLASS MACHINE TOOLS.

GRAND PRIX, PARIS, 1900.

Hartford Automatic Screw Machines.

In ten sizes, for making Screws, Studs, Bicycle Hubs and other pieces of circular cross section and various outlines from bars of round, square or hexagon metal, in diameter 1-16 to 3 1-16 inches. All needed adjustments are provided for. One man can attend a half dozen machines.

Tools made to order for finishing pieces to sample.

Write for further particulars and "Hardware" Catalog.

PRATT & WHITNEY COMPANY,

Works: HARTFORD, CONN.

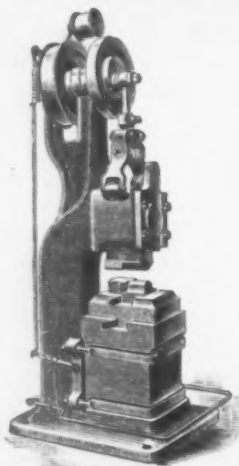
BRANCHES: New York, 123 Liberty St.; Boston, 144 Pearl St.; Chicago, 42 S. Clinton St.; Buffalo, Seneca and Wells Sts.

FOREIGN REPRESENTATIVES: London, England, Buck & Hickman, 280 Whitechapel Road; Paris, France, Fenwick Freres & Co., 21 Rue Martel; V. Lowener, Copenhagen, Denmark, and Aktiebolaget V. Lowener, Stockholm, Sweden; Dusseldorf, Germany, and Vienna, Austria, de Fries & Co.

PORTABLE POWER TOOLS

THOS. H. DALLETT & CO.,
York St. and Sedgley Ave.,
PHILADELPHIA, PA., U. S. A.
SEND FOR CATALOGUE.

DUPONT POWER HAMMER.



FEATURES.—Simplicity; Easy Adjustment; Great Economy of Power, Durability; Large Range of Work.

SEND FOR CATALOGUE.

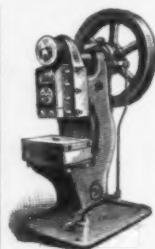
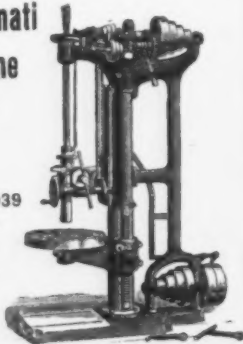
THE DUPONT MANUFACTURING CO.,
ST. JOHNSBURY, VT., U. S. A.

Why is it?

that more "Cincinnati" Drills are used than any other? Simply because they've proven after the severest tests to be the best.

We have a new geared tapping attachment on the spindle of our drills which we would be glad to explain.

Cincinnati
Machine
Tool
Co.,
1935-1939
Western
Ave.,
CINCINNATI,
O.



Tools FOR Sheet Metal Workers.

Tinners' Tools and Machines,
Presses and Dies,
Squaring and Rotary Shears,
Rolls, Punches.

MADE BY

Niagara Machine and Tool Works,
Catal. I sent free. BUFFALO, N. Y.

Automatic Machinery FOR WIRE AND SHEET METAL GOODS. Power Presses.

THE AUTOMATIC MACHINE CO.,
Bridgeport, Conn.

SEND FOR DESCRIPTIVE CIRCULAR
WITH SAMPLE PAGES AND
ILLUSTRATIONS FROM

THE
New Metal Worker Pattern Book.

DAVID WILLIAMS COMPANY
PUBLISHERS AND BOOKSELLERS

232-233 William Street,

New York.

11-IN. SPEED LATHE.



Combination
Wheel and Lever
Tailstock.

SEND FOR CIRCULAR.

R. E. KIDDER,
33 Hermon St.,
Worcester, Mass.

HIGLEY COLD METAL SAWS



and GRINDERS for
MILLS, SHOPS,
FOUNDRIES,
RAILROADS,
BRIDGE and
STRUCTURAL WORKS.

J. R. VANDYCK, SELLING AGT.,
136 LIBERTY ST., NEW YORK.

McDowell, Stocker & Co., Canal St., Chicago.
Niles Tool Works, London, England.
White, Child & Beney, Vienna, Austria.
V. Lowener Copenhagen, Denmark.

PROFIT PRODUCING POINTS.

STRENGTH

*Properly proportioned weight.
Large area of slide surface.*

SWIVELING CARRIAGE

*In universal machines revolves
through 360 degrees. No limit
to angularity of the table.*

QUICK MANIPULATION

*Vertical shaft at oblique angle.
Operating handles in clutch form.*

CORRECT FEED SPEED

*Twelve changes within most
useful range quickly obtained.*

AUTOMATIC FEEDS

Horizontal, cross and vertical.

UNIVERSAL HEAD

*Absolutely universal. Turns
through 360 degrees.*

PROPER SPINDLE SPEED

*Sixteen changes in back geared
machines provides right speed
for each cutter.*

OUR 1900 CATALOG WILL INTEREST YOU.

THE CINCINNATI MILLING MACHINE CO., Cincinnati, O., U. S. A.

EUROPEAN AGENTS—Schuchardt & Schutte, Berlin, Vienna, Brussels, Stockholm, Cologne, St. Petersburg, New York. Adolph Janssens, Paris. Chas. Churchill & Co., Ltd., London, Birmingham, Manchester, Newcastle-on-Tyne, Glasgow. The Niles Tool Works Co., 2 Victoria St., London.



So far as the best material and workmanship, together with careful inspection and tests, can bring about perfection our tools are perfect when shipped, and we guarantee them.

PNEUMATIC TOOLS OF ALL KINDS.

CATALOGUE FREE.

PHILADELPHIA PNEUMATIC TOOL COMPANY,

New York, 149 Broadway,
Pittsburgh, Wood and Water Sts.

Philadelphia, Stephen Girard B'd'g.
Boston, Exchange Building.



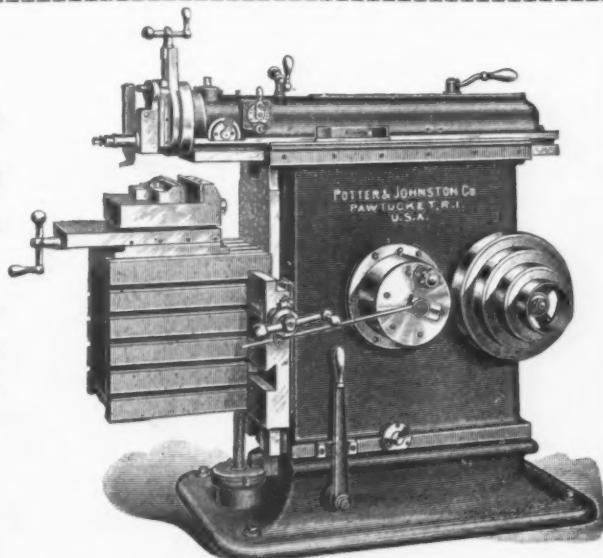
24-inch SHAPER.

This 24-in. Shaper has power down feed on any angle. Automatic stop to down feed. Table raised and lowered by power.

Send for complete description of this machine. Write for particulars of DOUBLE TURRET MANUFACTURING LATHE AND SIMPLEX AUTOMATIC.

Potter & Johnston Company,
PAWTUCKET, R. I., U. S. A.

New York Office, 126 Liberty St., - Walter H. Foster, Manager.



FOREIGN AGENTS:

Chas. Churchill & Co., London, Birmingham and Manchester, England, and Glasgow, Scotland. Gustav Dieckmann & Sohn, Berlin, Germany. Adolphe Janssens, Paris, France, and Brussels, Belgium. V. Lowener, Copenhagen, Denmark, and Stockholm, Sweden.

RADIAL, MULTIPLE, UPRIGHT
and LOCOMOTIVE SHOP

DRILLS.

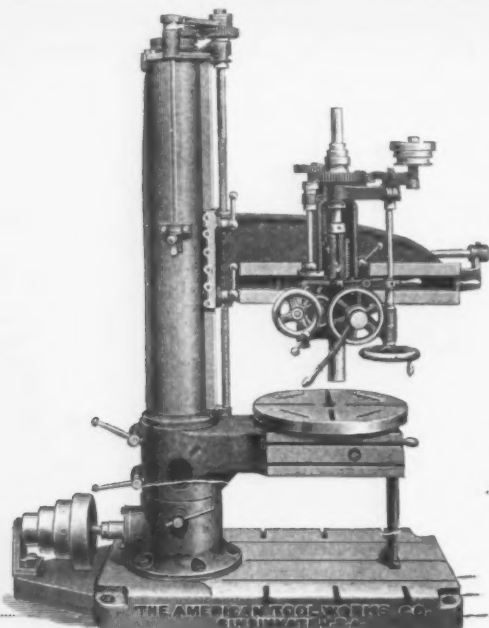
MACHINE TOOLS.

SEND FOR
CATALOGUE.

EXTENSION, FACING
and ENGINE

LATHES.

EDWIN HARRINGTON. SON & CO., Philadelphia, Pa., U. S. A.



A NEW RADIAL DRILL.

The accompanying illustration represents our NEW 2½ ft. arm Radial Drill, which has been designed to handle a wide range of work in both light and medium manufacturing, and is capable of drilling and tapping with like facility all holes up to 2 in. in diameter. Write for particulars.

The American Tool Works Co.

Works: Cincinnati, U. S. A.

New York Office: 120 Broadway, Geo. Place, Agent.
 Philadelphia: The Fairbanks Co.
 New Orleans: The Fairbanks Co.
 LONDON: Alfred Herbert, Ltd., 7 Leonard St., Finsbury, E.C.
 DUSSELDORF: De Fries & Co., Act. Ges., Graf Adolph Strasse, 83-87.
 VIENNA: De Fries & Co., Act. Ges., Eschenbachgasse, 9.
 Chicago Store: 68-70 South Canal Street.
 Pittsburgh Store: 107 Wood St., L. V. Blue, Agent.
 Cleveland: The Strong, Carlisle & Hammond Co.
 COVENTRY: Alfred Herbert, Ltd.
 ANTWERP: Nyssens Frères, 33 Rue des Peignes.
 Boston Store: 26 Federal Street.
 Baltimore: The Fairbanks Co.
 BERLIN: De Fries & Co., Act. Ges., Kloster Strasse, 13-15.
 PARIS: Roux Frères & Cie., 51 Boulevard du Temple.
 MOSCOW: Alfred Stucken.

BAYLEY STEAM HOT BLAST HEATING APPARATUS



For FACTORIES, MACHINE SHOPS, and all
 FOUNDRIES, LARGE BUILDINGS
 IS UNEQUALED.

Manufacturers of Structural Iron Work, Foundry and Machine Work, Steam Traps.

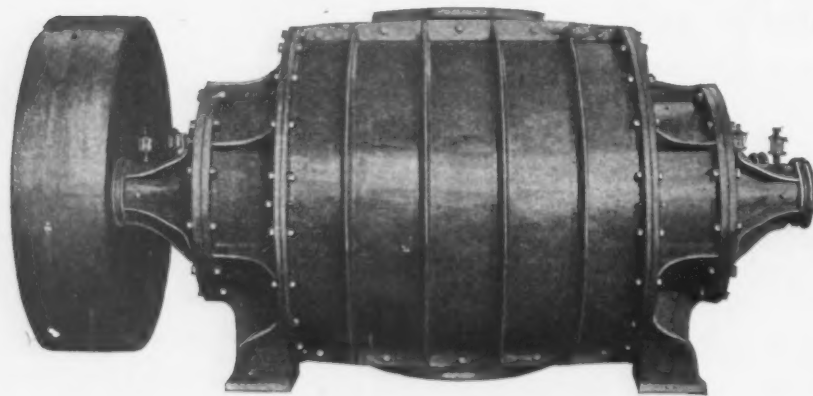
HIGH GRADE HEAVY MACHINERY CASTINGS A SPECIALTY.

Write for full particulars and catalogue.

WM. BAYLEY & SONS CO.,

732-766 Greenbush St., Milwaukee, Wis.

(New Century Pattern.)



THE MOST AIR FOR \$1

IS GIVEN BY

The **Green Rotary Pressure Blower,**

And it weighs less, occupies less space, and is more positive in action than any other blower.

SEND FOR NEW CATALOGUE B.

Wilbraham Baker Blower Co.,
 2518 Frankford Ave., Philadelphia, U. S. A.

Sales Agents, FRASER & CHALMERS, Inc., Chicago, Ill., and Branch Houses.

**WINDSOR
 MACHINE
 CO.**

WINDSOR, VT.
 U. S. A.

TURRET LATHES.

Brass-Working Machinery.



Splitting Shear.

PUNCHING and SHEARING MACHINERY.

HAND AND BELT POWER.

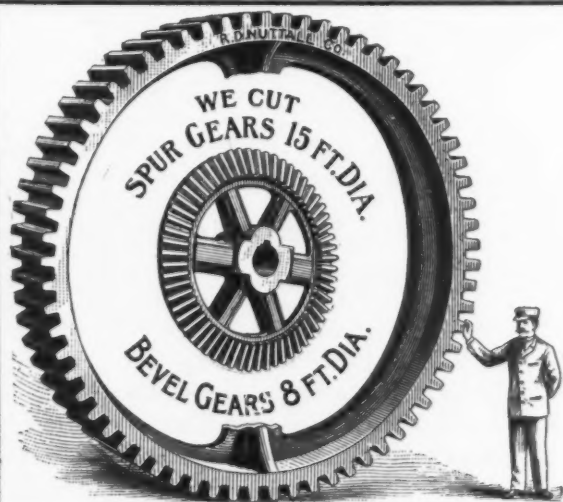
MADE BY

New Doty Mfg. Co.,

Janesville, Wis., U. S. A.

The Shear shown in cut is designed for splitting heavy sheets. It will split sheets of any width or any length and three-fourths inch or less in thickness. It is also fitted with special knives for cutting angle iron up to and including four-inch angles. It cuts the angle iron square off without destroying the shape of the angle.

SEND FOR CATALOGUE.



R. D. NUTTALL COMPANY,

PITTSBURGH, PA.



GEAR CUTTERS.

Solid Adjustable Reamers

Made in four styles and all sizes.



Write for our new Tool Catalog No. 6.



The John M. Rogers, Boat, Gauge & Drill Works,

Gloucester City, New Jersey, U. S. A.



MULTIPLE SPINDLE DRILLS,

4 TO 24 SPINDLES—3-IN. TO 37-IN. CIRCLE.

BAUSH MACHINE TOOL CO.,

Springfield, Mass., U. S. A.

SUCCESSORS TO

BAUSH & HARRIS MACHINE TOOL CO.

AMERICAN AGENTS: MANNING, MAXWELL & MOORE, New York; Chicago; Pittsburg; Cleveland.

EUROPEAN AGENTS: SELIG SONNENTHAL & CO., London. E. SONNENTHAL, Jr., Berlin.

NILES ELECTRIC TRAVELING CRANES.



REASONABLE DELIVERIES. APPLY TO

The Niles Tool Works Co.,

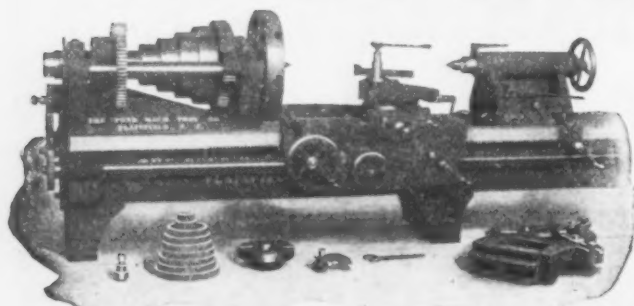
NEW YORK, 136-138 Liberty Street.
PHILADELPHIA, 21st and Callowhill Streets.
BOSTON, 65 Oliver Street.

CHICAGO, Western Union Building.
PITTSBURG, Carnegie Building.
LONDON, 25 Victoria Street, S. W.

POND LATHES.

POND MACHINE TOOL CO., - - Plainfield, N. J.

Awarded Gold Medal at Paris Exposition.



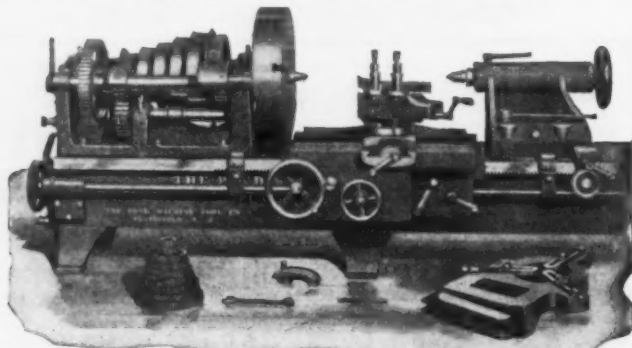
28-INCH BACK-GEARED LATHE.

AGENTS:

Berlin and Vienna,
GUSTAV DIECHMAN & SOHN,
Paris and Brussels,
ADOLPHE JANSSENS,
St. Petersburg,
ATALANTA TECHNICAL AGENCY.

OFFICES:

NEW YORK, 136-138 Liberty St.
CHICAGO, Western Union Building.
PITTSBURG, Carnegie Building.
LONDON, 25 Victoria Street, S. W.



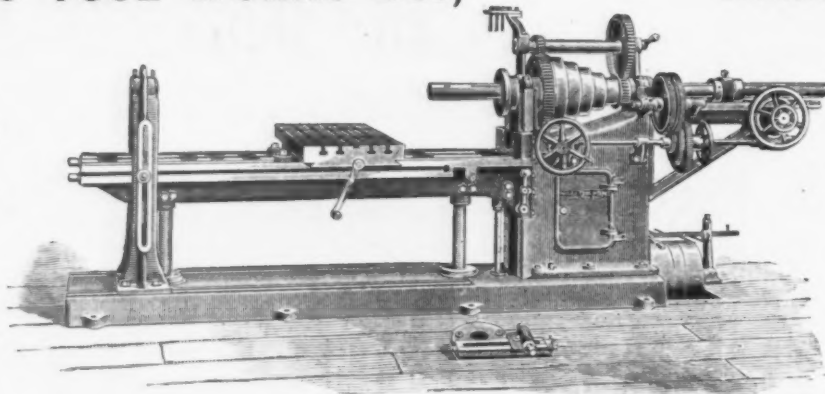
32-INCH TRIPLE-GEARED LATHE.

THE NILES TOOL WORKS CO., - - Hamilton, Ohio.

Machine
Tools.

Awarded
Grand Prize and Gold
Medal at Paris
Exposition.

Railroad
Machinery
A Specialty.



Boring
and
Turning
Mills.

No. 3 HORIZONTAL BORING AND DRILLING MACHINE.

Offices: NEW YORK, 136-138 Liberty St.
BOSTON, 65 Oliver St.
PHILADELPHIA, 21st and Callowhill Sts.
CHICAGO, Western Union Building.
PITTSBURG, Carnegie Building.
ST. LOUIS, 615 N. 4th St.
LONDON, 23-25 Victoria St., S. W.

Agents: PARIS, H. Glaenger & Perreaud
COPENHAGEN, V. Lowener
STOCKHOLM, Ak. V. Lowener,
BRUSSELS, Adolphe Janssens.
HELSINGFORS, Werner Hult.
ROTTERDAM, Van Rietschoten & Houwens.
JOHANNESBURG, Sheriff, Swingley & Co.

E. W. BLISS CO.,

11 ADAMS ST., BROOKLYN, N. Y.

ALSO OWNERS OF
THE STILES AND PARKER PRESS CO.

BRANCHES:

WESTERN OFFICE: 39 S. Canal Street, Chicago, Illinois.
EUROPEAN OFFICE: 19 Ave. De La Grande Armée, Paris, France.
LONDON AGENCY: The Projectile Co., Ltd., New Road, Wandsworth
Road, S. W.
BERLIN AGENCY: }
VIENNA " } Schuchardt & Schütte.
COLOGNE " }
STOCKHOLM " }
ST. PETERSBURG AGENCY: }

We have been AWARDED the GRAND PRIZE at the PARIS
EXPOSITION of 1900 for the Unsurpassed
Excellence of our Machinery.

PRESSES,

Dies, Shears, Drop Hammers and
other Sheet Metal Working Tools.

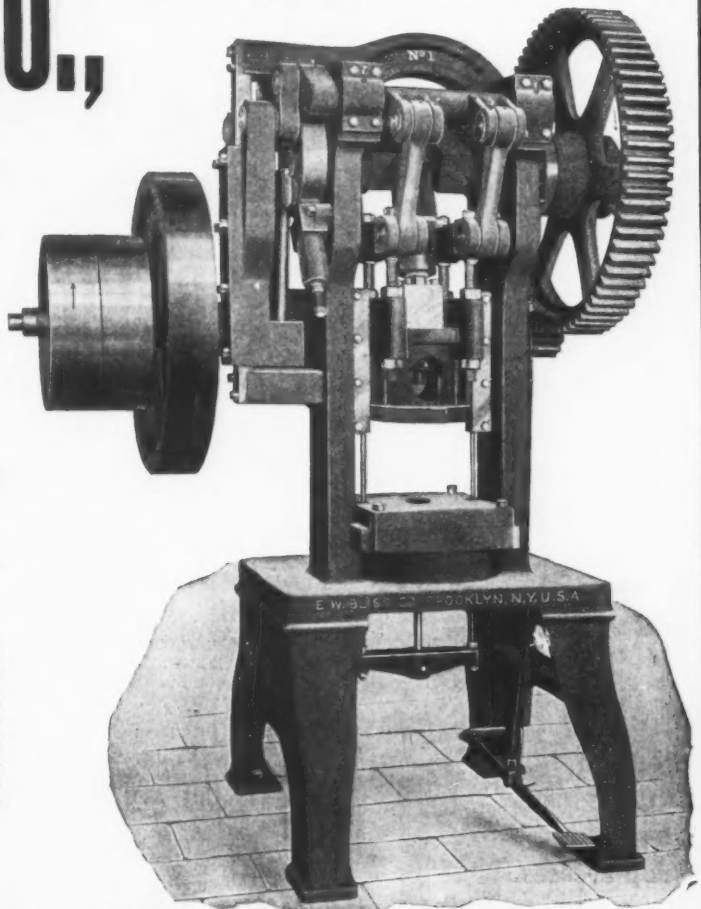
The "Bliss" Patent Toggle Drawing Presses.

The acknowledged superiority of our Toggle-drawing Presses over Cam-drawing Presses of any style has caused to be put upon the market several types of toggle presses in which the dwell of the blank-holder toggles is determined by cams, cam plates, ratchets or interposed springs, all of which devices introduce into the construction elements of complication, wear and inaccuracy, which are entirely obviated by the patented link motion of the Bliss Toggle Presses, in which not a single cam, irregular working surface, friction roll or spring is used, so that the wear is taken entirely by round studs working in round holes. This results in the least possible repairs of the least costly kind, and in motions of the smoothest nature.

Write for Full Particulars. Correspondence Solicited.

Designers and Builders of

SPEC'L MACH'Y.



"Bliss" No. 1 Patent Toggle-Drawing Press.

ALL KINDS PRESSES, DIES AND TOOLS

FOR CUTTING AND FORMING ARTICLES OF SHEET METAL, WIRE, LEATHER, PAPER, &c.
AUTOMATIC CAN MAKING AND SPECIAL MACHINERY.

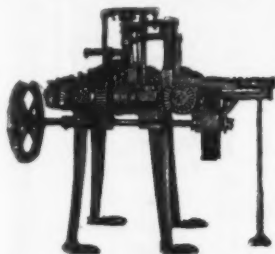
CORRESPONDENCE SOLICITED.

ADRIANCE MACHINE WORKS,

Near Hamilton Ferry.

124 IMLAY ST., BROOKLYN, N. Y., U. S. A.

The article shown on the
opposite side was



made on this machine.

AUTOMATIC MACHINES

or any kind of special machinery
for rapid work

DESIGNED AND BUILT.

Special Power Presses, Wire Forming Machinery,
Hook and Eye, Safety Pin and all kinds of Pin
Machinery.

LET US KNOW YOUR NEEDS.

The A. H. NILSON MACHINE CO., Bridgeport, Conn.,
U. S. A.

This difficult piece was
made on the machine



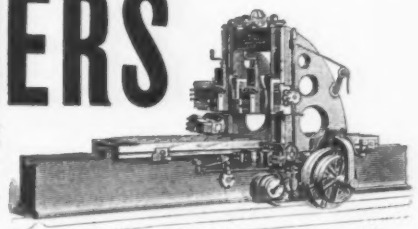
shown on the opposite side
of this advertisement.

CINCINNATI PLANERS

have a Patent Dirt Proof Table which prevents chips from falling into the Vs, cutting them up. They have a safety Locking Device which avoids accident and spoiling of work. They have Micrometer Adjustment to the down feed, and a Patent Combination Friction that will not stick or burn out. Made in ten sizes, 24 in. to 56 in. square.

AWARDED MEDAL AT THE PARIS EXPOSITION,

THE CINCINNATI PLANNER CO., - - - CINCINNATI, U. S. A.

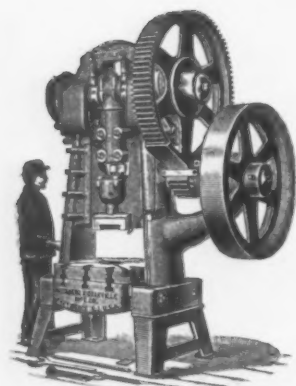


Rod and Wire,
Merchant Bar,
Flat Stock,
Cold Rolling,
Wire Flattening
Mills.

MILLS

WITH OR WITHOUT ROLLER BEARINGS.

Brass,
Tin and
Copper,
Zinc and
Tin Foil
Mills.



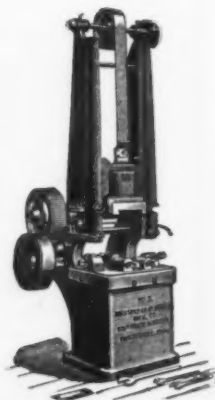
MOSSBERG AND GRANVILLE MFG. CO., PROVIDENCE, R. I.

NEW YORK OFFICE,
150 Nassau St.

EXHIBITION AT
PHILADELPHIA BOURSE.

FOREIGN AGENTS:

CHARLES CHURCHILL & CO., Ltd., London and Birmingham, England.
A. MATHEY DORET, La Chaux-de-Fonds, Switzerland.
DE FRIES & CO., Dusseldorf and Berlin, Germany, and Vienna, Austria.
ADOLPHE JANSSENS, Paris, France.



Power and
Plain Drop-
Automatic
Drop Presses.
Dial Presses.
Sprue Presses.

PRESSES

Wire Drawing
Machinery.
Automatic
Draw Benches.
Coilers.
Rotary Swaging
Machines.

STURTEVANT ENGINES

*Our Specialty: High grade
engines of medium capacity
for high or low pressure.
60 sizes under 200 H.P.*

— ALSO —

- Blowers
- Exhausters
- Steam Fans
- Electric Fans
- Electric Motors
- Generating Sets
- Forges
- Exhaust Heads
- Steam Traps
- Heating
- Ventilating
- Drying Apparatus
- Mechanical Draft

B.F. STURTEVANT & CO. BOSTON.
NEW YORK · PHILADELPHIA · CHICAGO · LONDON

STURTEVANT FORGES

*35 Styles and Sizes
Perfect Workmanship
Substantial Designs
Carefully fitted mechanism*

— ALSO —

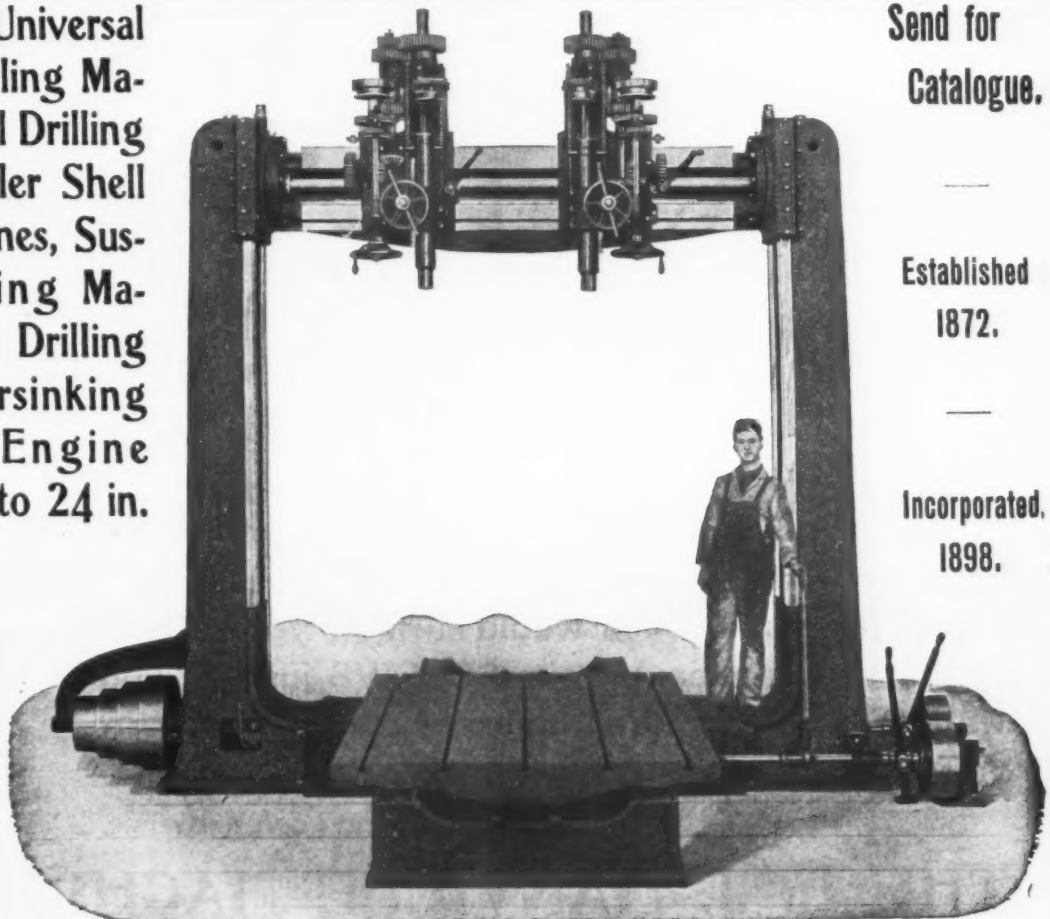
- Blowers
- Exhausters
- Steam Fans
- Electric Fans
- Engines
- Electric Motors
- Generating Sets
- Exhaust Heads
- Steam Traps
- Heating
- Ventilating
- Drying Apparatus
- Mechanical Draft

B.F. STURTEVANT & CO. BOSTON.
NEW YORK · PHILADELPHIA · CHICAGO · LONDON

**PLAIN and Universal
Radial Drilling Ma-
chines, Vertical Drilling
Machines, Boiler Shell
Drilling Machines, Sus-
pension Drilling Ma-
chines, Radial Drilling
and Countersinking
Machines, Engine
Lathes, 12 in. to 24 in.
swing.**

**Highest Award,
Chicago,
1893.**

**Gold Medal,
Brussels,
1897.**



**Send for
Catalogue.**

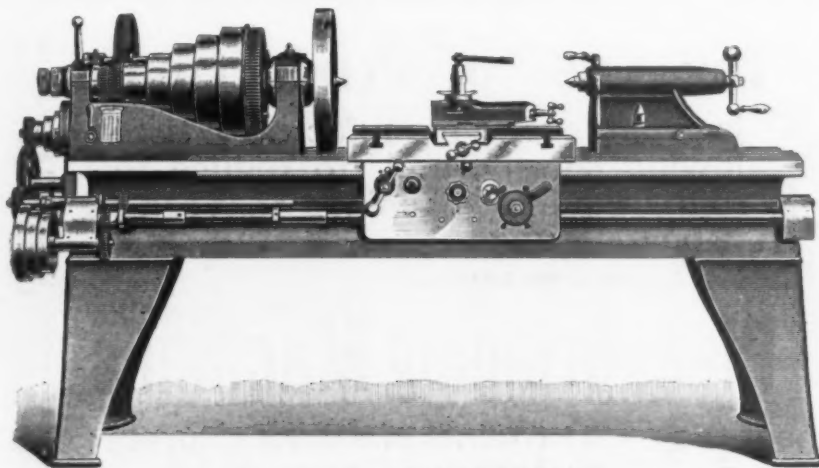
**Established
1872.**

**Incorporated,
1898.**

PRENTICE BROS. COMPANY.

WORCESTER, MASS., U. S. A

FOREIGN AGENTS: Schuchardt & Schutte, Berlin, Vienna, Brussels, Stockholm, Cologne and St. Petersburg. Ad. Janssens, Paris. Chas. Churchill & Co., London and Birmingham.



18 in. x 8 ft. DRAPER LATHE.

**HAND LATHES,
CHUCKING LATHES,
72 in. BORING MILL,
ENGINE LATHES
from 14 in. to 42 in. inclusive.**

**SEND FOR CATALOGUE
AND PRICES.**

**Draper Machine
Tool Co.,**

**140 GOLD ST.,
WORCESTER, MASS.,
U. S. A.**

Sole European Agents:
SELIG-SONNENTHAL & CO.,
85 Queen Victoria St., London.

Sole Agent in Germany:
E. SONNENTHAL, Junr., Berlin, Neue Promenade 5.

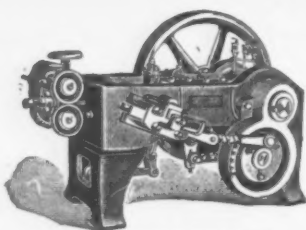


**There is never any question about the
quality of a B. F. Barnes Upright Drill.**

The name of the B. F. Barnes Company on a Drill is in itself a guarantee of superior workmanship and strictly high grade materials. The tool here illustrated is our 20-inch Drill, and we guarantee it to drill up to 1 in. in steel and 1 1/4 in. in cast iron at a good gait and without strain. We build larger sizes and will be glad to send full data on our entire line to interested people.

B. F. BARNES COMPANY, Rockford, Ill.

AGENCIES—Hill, Clarke & Co., Boston. Prentiss Tool & Supply Company, New York. The Pratt & Whitney Company, Chicago. The U. Baird Machinery Company, Pittsburgh. Chas. A. Strellinger Co., Detroit. O. L. Packard Machinery Company, Milwaukee.



DOUBLE STROKE HEADERS.

A "Trade Secret" Out.

There is money for you in small

STEEL AND BRASS SCREWS

(with rolled threads)

THREE

OF OUR

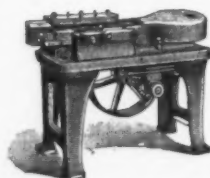
Automatic Machines

will do the entire work at a cost for labor which would surprise you. Then, again, you can have your **SCREWS** just as you want them, and—more important still—just **WHEN** you want them.



SCREW SLOTTERS.

Why don't you make your own and Save Money.

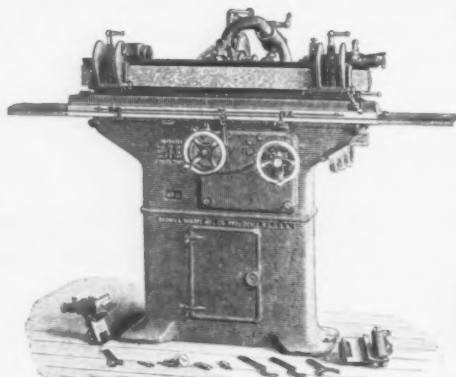


SCREW THREAD ROLLERS.

THIS LINE IS BUILT ONLY BY

THE E. J. MANVILLE MACHINE CO.,

WATERBURY, CONN., U. S. A.



The Cost of Production

is what every manufacturer is following closely, and, to reduce this item, requires machines that can be depended upon.

Such are our

Plain Grinding Machines

Designed especially to meet the requirements of manufacturers; they are compact, rigid, easily understood, and have all levers, etc., conveniently arranged for quick manipulation.

THE AUTOMATIC CROSS FEED is an important feature; it enables work to be sized automatically to within .00025 of an inch.

These machines are made in three sizes: 4 in. x 30 in., 7 in. x 48 in. 7 in. x 72 in., and will grind all work that can be held on dead centres.

We are pleased to furnish detailed information, or to mail catalog and descriptive circulars to any address.

BROWN & SHARPE MFC. CO., Providence, R.I., U.S.A.

A FEW Exceptionally Good SECOND-HAND TOOLS AT LOW PRICES.

UNIV. GRINDING MACHINE, capacity 12 x 40 in., No. 3, "Brown & Sharpe"

UNIV. MILLER, No. 1, "Brown & Sharpe."

SCREW MACHINE, No. 2, Wire Feed, "Garvin."

AUTO. GEAR CUTTER, cuts 50 in. Spur Gears, "Gould & Eberhardt."

UPRIGHT BORING AND TURNING MILL, 60 in. swing, double head, "Sellers."

HOR. BORING AND DRILLING MCH., Style "D," 4 in. bar, center of 60 in., "Newark."

TURRET CHUCKING LATHE, 36 in. swing, with feed and chuck, "Lodge-Davis."

ENGINE LATHES, 14, 16, 18, 20, 26, 32 and 50 in. swing.

PLANERS, 24, 30, 36 and 72 in. wide.

SHAPERS, Fitchburg, 14 in. traveling head.

RADIAL DRILLS, 84 and 96 in. swing, improved style with tapping attachment.

PRESSES, Stiles pattern No. 1, 2 and 3 BOILER PLATE PLANNER, 14 ft., "Hilles & Jones."

STEAM HAMMER, 300 lbs. "Ferris & Miles."

J. J. McCABE,
14 Dey Street, NEW YORK.

FOR SALE. IMMEDIATE DELIVERY.

One 18 in.-34 in. x 42 in. Fitchburg Tandem Compound Automatic Engine.

One 16 1/2 in.-34 in. x 42 in. Cross Compound Fitchburg Automatic.

One 28 in. x 48 in. Corliss Engine.

One 26 in. x 60 in. Corliss Engine.

One 26 in. x 48 in. Greene Engine.

One 18 in.-30 in. x 16 in. Westinghouse Compound.

One 22 in. x 42 in. Putnam Engine.

One 20 in. x 42 in. Greene Engine.

Two 14 in.-28 in. x 28 in. Cross Compound Fitchburg.

One 13 in.-20 in. x 14 in. Ideal Compound.

Two 13 in.-22 in. x 13 in. Westinghouse Compound.

One 14 in. x 14 in. Armstrong & Sims.

Two 10 in.-18 in. x 12 in. Ball Compound.

Several 50 to 300 H. P. high speed Automatic Engines.

Two 250 H. P. Babcock & Wilcox Boilers.

Two 100 H. P. National Water Tube Boilers.

One 50 H. P. Babcock & Wilcox Boiler.

Six 125 H. P. Horizontal Tubular Boilers.

Four 125 H. P. Vertical Boilers.

One 100 H. P. Vertical Boiler.

Several 40, 60, 80 to 100 H. P. Boilers.

Several 20, 25, 30, 40, 75 H. P. Locomotive Boilers.

5 to 50 H. P. Vertical Boilers.

Large stock of new Machinery ready for immediate delivery; Steam and Centrifugal Pumps; Lathes, Planers, Shapers, Drills, Milling Machines, Radial Drills, Punches, Shears, Dynamos, Motors, etc.

FRANK TOOMEY, Nos. 127-131 N. Third St., Phila., Pa. Long Distance Telephone 261 and 262.

FOR QUICK TURN.

DYNAMOS:

Two 540 Lt., 30 K. W. "HI" Thomson-Houston, ea., \$300

Extra armature for either above..... 100

Latest type Gen. Elec. "IB" 1 1/2 K. W., 125v..... 55

MOTORS:

15 H. P., 500v., Westinghouse..... 190

5 H. P., 250 or 500v., Elliott M.P. (new armature)..... 105

All above overhauled and guaranteed. Subject to prior sale. Terms cash.

THE W. C. BENBOW CO., Columbus, Ohio.

For Immediate Delivery.

Engine Lathes, 10 in. to 32 in. swing.

Speed Lathes, 10 in. to 20 in. swing.

Shapers, 10 in. to 26 in. stroke.

Planers, 20 in. to 34 in.

Drill Presses, 10 in. to 28 in.

Milling Machines, Hand and Power.

Screw Machines and Monitor Lathes up to 20 in.

Feed and Power Presses, a variety of sizes.

Drop Hammers with and without automatic lifts.

Hurlbut & Rogers Cutting-off Machines.

Send for catalogue of Presses.

The Danielson Machine & Tool Co.,
CLEVELAND, O.

FOR SALE.

One 37 in. x 37 in. x 8 ft. "Harrisburg Fdy. & M. Co." Planer.

One 26 in. x 26 in. x 6 ft. New York Steam E. Co. Planer.

One 32 in. Lodge & Davis Drill Press.

One 42 in. x 24 ft. Engine Lathe. H. F. & M. Co.

One 86 in. x 10 ft. Engine Lathe. H. F. & M. Co.

One 30 in. x 14 1/2 ft. Engine Lathe. H. F. & M. Co.

One 36 in. Drill Press. Back geared. H. F. & M. Co.

One 36 in. "Alfred Box" Radial Drill Press.

One Hilles & Jones Punch and Shears, 20 in. throat.

Several Traveling and Jib Cranes.

One 12 in. x 28 in. Watts-Campbell Corliss Engine.

One 12 in. x 30 in. Allis Corliss Engine.

One 14 in. x 32 in. Watts-Campbell Corliss Engine.

L. F. SEYFERT'S SONS,
437-441 N. 3d St., Philadelphia, Pa.

Second-Hand Machinery

Richards open side Planer and Shaper, planes 8 ft. long, 25 in. wide, 24 in. high

30 x 30 x 10 Wm. Sellers Spiral Geared Planer.

22 in. Walcott Geared Shaper.

15 in. Hendey Shaper.

36 in. Snyder Drill, with revolving table and 24 in. Chuck fitted.

30 x 14 Fifield Lathe, compound rest.

18 x 6 Muller Lathe, compound rest.

14 x 8 Porter Lathe, elevating rest.

14 x 6 Reed Lathe, elevating rest.

14 x 6 Flather Lathe, plain rest

14 x 6 Hendey-Norton Lathe, plain rest, taper attachment.

1 1/2 in. National Bolt Cutter.

25 lb. Justice Hammer.

No. 1 Slate's Milling Machine.

S. M. YORK CO., Cleveland, O.

Special Bargains. Second-hand Machinery.

3 14 in. x 6 ft. Flather Lathes, Plain Rest.

16 x 6 ft. Blaisdell, R. & F. Rest.

18 in. x 10 ft. Robbins Lathe, compound rest.

30 in. x 10 ft. Putnam Lathe, chuck fitted.

26 in. x 14 ft. Draper Lathe, good as new.

28 in. x 13 ft. Fay & Scott Lathe.

23 in. x 22 in. x 4 ft. Pease Planer.

24 in. x 24 in. x 6 ft.

34 in. Hendey Friction Shaper.

22 in. Snyder Drill, back geared, complete.

54 in. Radial Drill with tapping attachment.

Kempsmith Back G'ed Univ. Milling Mch. No. 8.

16 in. x 6 ft. American Square Arbor Fox Lathe.

Pratt & Whitney Screw Shaving Machine.

36 in. Gould & Eberhardt Auto. Gear Cutter.

3 No. 2 Wire Feed Screw Mach., 16-16 in. capacity.

The Fairbanks Company,
701, 703, 705 Arch St., - Philadelphia, Pa.

FOR SALE.

3 good Combination, standard gauge cars; seating capacity, 32.

4 standard gauge Saddle Tank Locomotives, 40, 25, 11, 7 1/2 ton each.

Also other equipment, both standard and narrow gauge.

POULTERER & CO.,
410 Bullitt Building, Philadelphia, Pa.

FOR SALE.

One 9 x 10 Fitchburg Upright Engine.

One 8 in. Lawrence Machine Co.'s Centrifugal Pump.

One Blake Stone Crusher, 15 x 9, with screen.

One large Emery Grinder, 1 1/2 in. spindle.

Also other machinery.

WM. FLINTOFF,
119 Haverhill St., Boston, Mass.

Second-hand Machinery For Sale.

Engines, Boilers, Pumps, Heaters, Iron and Wood Working Machinery, all makes, all kinds.

Shafting, Pulley Hangers, Boxes, etc. Mining, Cupola and Forge Blowers. We make a specialty of Saw and Planing Mill Machinery.

HARRIS MACHINERY CO.,
1045 Washington Ave., S. E., Minneapolis, Minn.

Hilles & Jones Plate Straightening Rolls No. 2.

Has six rolls 10 in. diameter and will take 68 in. between housings, weight 23,400 lbs.

HENRY F. HILL,
38 Oliver St., - Boston, Mass.

D

New and Second-Hand Machine Tools.

HARRINGTON SUSPENSION DRILL No. 1.

USED ONLY THREE MONTHS.

The Lodge & Shipley Machine Tool Co.,

Cincinnati, Ohio, U. S. A.

Second-Hand Machine Tools

IN FIRST-CLASS SHAPE.

1 Brainard Automatic 18 in. Gear Cutter.

1 Brainard No. 24 Miller, bk. geared

1 Lodge-Davis No. 0 Miller, "

1 24 in.-44 in. x 16 ft. Fish Cap Lathe.

1 Cincinnati No. 1 Universal Miller.

1 Perkins No. 2 Foot Lever Press.

1 Hendey 15 in. Friction Shaper.

1 Gleason Suspension Drill.

1 Eddy 24 in. Chucking Machine with power feed.

1 Hurlbut-Rogers 2 in. Cutting-off Machine.

1 15-ton Bradley Hammer.

1 Yale & Towne Electric Traveling Crane, 6-ton, 25 ft. span.

HILL, CLARKE & CO.,
156 Oliver St., Boston, Mass.

SECOND-HAND MACHINERY.

1 62 in. x 60 in. x 22 ft. Planer.

1 54 in. x 54 in. x 30 ft. 4 Head Planer.

1 32 in. x 32 in. x 12 ft. 2 "

1 30 in. x 30 in. x 8 ft. Planer, A1.

1 30 in. x 16 ft. New Haven Lathe.

1 12 in. Crank Shaper, Cheap.

1 14 in. x 42 in. Morgan Steam Hammer.

1 5 ton Miles Steam Hammer.

1 Plate Planer, planes 16 ft. long.

2 600 lbs. Merrill Drop.

2 Combined Punch and shear, cuts and punches 1/2 in.

1 Sand blast outfit, complete.

1 150 lb. Merrell Air Cushioned Hammer.

1 6 ft. 6 in. Gap, 50 ton Hydraulic Riveter.

1 14 in. x 14 in. x 15 A1 Clayton Duplex Air Compressor.

2 Pratt & Whitney Wire Feed Screw Machines.

NEW YORK MACHINERY DEPOT,
Office, 178 Broadway, N. Y.

FOR SALE.

2 300 H. P. National Water Tube Boilers which are practically new. Complete with all fittings and Shaking Grates.

2 180 H. P. Babcock & Wilcox Water Tube Boilers, with all fittings.

32 in. x 60 in. Watts-Campbell Corliss Engine with Condenser and National Heater.

1000 Light Direct Connected Engine and Dynamo.

12 in. x 12 in. x 18 in. Ingersoll Compressor.

All low for prompt trade.

MARVIN BRIGGS
12 Broadway, N. Y. City.

Second-hand Machinery

ENGINE LATHES.

2 in. x 5 ft. Le Blond Tool Room.
12 in. x 4 ft. Pond, R. & F.
12 in. x 5 ft. Young, plain.
12 in. x 6 ft. Blaisdell, R. & F.
14 in. x 5 ft. Putnam, R. & F.
14 in. x 6 ft. Porter, R. & F.
24 in. x 6 ft. Ames Manf'g Co.
24 in. x 6 ft. Fuller, R. & F.
24 in. x 8 ft. Fuller, R. & F.
24 in. x 10 ft. White, taper, "old style."
27 in. x 12 ft. W. L. & Co., bk. gd. plain turning.
36 in. x 12 ft. back geared turning.
40 in. x 16 ft. geared plain turning.
1 No. 2 Am. Tool & Mach. Co. Lathe.
12 in. x 5 ft. Davis, R. & F.
14 in. x 6 ft. Davis, plain.
14 in. x 6 ft. Pratt & W. R. & F. and Taper.
16 in. x 8 ft. Pratt & W. R. & F. and Taper.
SPEED LATHES.
212 in. x 5 ft. B. G. Speed.
111 in. x 4 ft. "
122 in. x 9 ft. "
PLANERS.
124 in. x 24 in. x 4 ft. W. & L.
126 in. x 26 in. x 6 ft. Pond.
126 in. x 26 in. x 8 ft. Pond.
PRESSES.
1 No. 3 C. & M. single.
1 No. 14 Stiles, heavy.
1 No. 5 Blake & Johnson arch.
1 No. 2 Heavy Screw Press.
1 No. 20 Bliss special incline.
Large stock new machines. Prices on application.

GRINDERS.

1 P. & W. Cutter Grinder.
SHAPERS.
19 in. Trav. Hd. Sellers.
13 in. Trav. Hd. Bement.
412 in. stroke Davis.
10 in. stroke Bliss.
124 in. G. & E., with ex. base.
DRILLS.
136 in. W. & L. "Gap."
13-spindle Hendey.
1 Bicycle Rim Drill.
1 Milliken Bench.
14 ft. arm Radial.
MILLING MACHS.
1 P. & W. Grant pattern.
1 Ames Hand.
SLOTTERS.
210 in. stroke Bement.
SCREW MACHS.
1 No. 2 W. F. Garvin.
1 No. 2½ W. F. P. & W.
15 in. x 6 ft. L. & D. Fox Turret.
120 in. x 6 ft. Bullard, plain.
130 in. x 6 ft. P. & W. Turret.
16 in. Pratt & W. Turret Lathe.
No. 2½ Garvin, W. F. Screw Machine.
MISCELLANEOUS.
13 H. P. Elec. Motor.
1 Morgan Hyd. Riveter.
1 Oil Separator.
2 Brazing Forges.
1 Bement D. H. Nut Taper.
No. 10 Brown & Sharpe Auto. Forming Turret Lathe.
Barr Cutter Grinder.

Two 20-ton Hand Traveling Cranes, 55 ft. 10 in. span.

Send us lists of machines you have for sale, or exchange.

THE NILES TOOL WORKS CO.,
136-138 LIBERTY STREET, NEW YORK CITY.

Material at Pittsburg, Penna.

126 in. x 42 in. L. H. Corliss, 50-ton fly wheel, 14 in. shaft.
124 in. x 48 in. L. H. Corliss, 16 ft. band wheel, 42 in. face.
128 in. x 48 in. R. H. Freeman balanced valve engine, 30 ton fly wheel, 30 ft. dia., 17 in. shaft.
130 in. x 36 in. heavy box bed slide valve engine, 12 in. shaft, 15 ton fly wheel.

Electric Light Plants.

110 in. x 12 in. Erie Ball Automatic engine, driving two Edison incandescent dynamos, 125 volts, 20 K. W., rated at 350 16 C. P. lights each, with two ampere and 2 volt meters, in first-class condition.
110 in. x 12 in. Russell automatic engine, driving one 30 K. W. General Electric dynamo, 125 volts, capacity, 500 lights.
This engine and plant have only been used one year, and are as good as new.
1 dynamo, 110 volts, 50 amperes, 50 16 C. P. incandescent lights, in good order.
1 15 light arc machine.

Material at Saginaw, Michigan.

1 pair 28 in. x 60 in. Harris Corliss Engines.
120 in. x 35 in. x 36 in. Tandem Compound Corliss Engine.
120 in. x 42 in. Harris Corliss Engine.
122 in. x 42 in. Wright four-valve auto. Engine.
112 in. x 12 in. Phoenix automatic Engine.
1 Silsby Fire Engine.
116 ft. Hilles & Jones Plate Planer.
120 in. Morton Keyseater.
124 ft. x 75 in. Band Wheel, 18 in. bore.

WICKES BROTHERS,

45th St. & A. V. R. Y., Pittsburg, Pa.
Tel., 249 Fisk.

IMMEDIATE DELIVERY.

12 Plain Vertical Engines, 8 to 50 H. P.
Plain Horizontal Engines, 10 to 150 H. P.
Automatic Engines, 3 to 300 H. P.
Direct Connected Engines, 3 to 300 H. P.
Simplicity, strength and Highest efficiency.
Hoisting Engines, 5 to 100 H. P., single and double cylinders and drums.
Full line Machine Tools and Wood Working Machinery.
Write us for Catalogue No. 100.
PENNSYLVANIA MACHINE CO.,
The Bourse, Philadelphia, Pa.

FOR SALE.

Second-hand Steam Engines, Boilers and Pumps. Large variety of sizes and makers.
F. McSWEGAN & SONS,
Dover St. and Franklin Sq., New York.

I Have No Use For the following:

A 48 in. x 8 ft. Pond Horizontal Cylinder Boring Mill.—A No. 1 order.

A 48 in. Heavy Drill Press.—Back geared, hand feed.

A 25 in. x 12 ft. 8 in. Sellers Lathe.—Triple geared, all feeds, good order.

A 16 in. x 24 in. Bement Crank Planer.—Good as new.

A 34 in. x 16 ft. New Haven Lathe.—Medium weight, screw feed.

A Sellers Axle Lathe.—One head.

A Lot Cheap Lathes.—Assorted sizes. Good for lots of work.

A Combined Punch and Shear.—Makes ½ in. holes in ½ in. plate.

2 No. 9 Sturtevant Blowers.—With countershafts.

Send for New List.

THOS. P. CONARD,
119 South Fourth St., Philadelphia.

FOR SALE.

50,000 Fire Brick, good as new.
500 feet 12 inch Cast Iron Bell Pipe.
300 New Sugar House Wagons.
Several large Iron Tanks, both round and square.

J. H. McCLURE & SON,

202 Walnut Place, Philadelphia.

2d HAND FEED WATER HEATERS.

Largest stock in America. Will be sold at bargain. These heaters are mostly taken in exchange for our Improved Berryman (Kelley's Patent), "A Little Giant," vastly superior to all other feed water heaters, both as to results and durability.

BENJ. F. KELLEY & SON, 91 Liberty St., N. Y.

FOR SALE.

2 Rotary Shears, 40 inch.
5000 ft. 1½ in. Cable.
Electric Pressure Blower.
Steam Pump, 20 x 14 x 30.
150 light Loomis Dynamo.

Materials of all kinds purchased.

WALSH'S SONS & CO.,

Newark, N. J.

2d-Hand Machinery Bargains.

One 16 in. x 36 in. Harris and 22 in. x 42 in. Wright Corliss Engines. High Speed Automatic, Simple, Compound, Condensing and Slide Valve Engines, also Blowing Engines, Air Compressors, Boilers, Heaters, Pumps, Vacuum Pans, Ice Machines, Electric Motors, Generators, Railway Supplies, Metal Working and General Machinery.

CHAS. BEHLEN,

72 Trinity Place, N. Y.

For Sale Cheap

Before Moving.

One 11 in. x 15 in. Erie C. C. Slide Valve Engine complete.

One 1 in. National Double Head Bolt Cutter. Both in good order.

DAWSON & GOODWIN,

41 South Canal St., Chicago, Ill.

WANTED.

Second-hand Arc Dynamos.

Send description and lowest cash price to
BLOMKUN BROS., 150 Reid St., Milwaukee, Wis.

BOILERS.

One 150 H. P. Heine Water Tube with full set fixtures and trimmings. Hartford allows 125 lbs. pressure.

One 66 x 16 Tubular Boiler, 64 4 in. tubes, brand new breeching and stack 32 in. x 60 ft. Allowed 100 lbs. pressure.

Four 60 x 16 Tubular Boilers, 44 4 in. tubes; 100 pounds pressure.

Two 44 x 16 Boilers, thirty 4 in. flues, new fronts, all fixtures and trimmings. Allowed 100 pounds pressure.

One 1200 H.-P. Berryman Feed Water Heater. Used two months. Built 1898.

ENGINES.

One right hand Wetherill Corliss Engine, cylinder 28 x 60; flywheel 20 feet diameter, weight 30 tons; shaft 15 in. x 12 ft. 6 in.; rope drive pulley 18 ft. diameter and grooved for 15 2-inch ropes; driven wheel 78 in. diameter grooved for 13 2-inch ropes; two iron idlers with boxes complete. With or without Independent Condenser 10x14x16.

20 in. x 24 in. Erie City "Class B" Automatic Cut-off Engine, balanced valve, left hand; Tangey bed, very heavy, weight complete, 35,000 lbs., 250 horse-power. Used four months.

One 10 x 20 Box Bed Slide Valve, wheel 72 in. x 12 in. complete.

W. W. WHITEHEAD,

DAVENPORT, IOWA.

One 18 x 48 Wheelock Corliss Engine, complete, \$1,000.
One 20 x 42 Wright Automatic Engine, complete, \$1,300.
Eight 60 x 16 Horizontal Steel Tubular Boilers, complete, a bargain.
12 x 36 Lane & Bodley refitted Corliss Engine at \$750.
Three 11 x 18 celebrated Straight Line Automatic Engines, complete, at a bargain.

Send for Late Stock List.

NORTON & COLE MACHINERY CO.,
Cincinnati, O., 6th & Carr Sts.

BARGAINS—SECOND-HAND TOOLS.

Planer 34 in. x 34 in. x 15 ft. table, Fairbanks.
Double Lathe, 32 in. swing, 20 ft. bed. Gage & Campbell.
Single Lathe, 15 in., 16 in., 17 in. and 18 in. swing, 6 ft. to 8 ft. bed.
Blower, No. 5½. Baker.
One H. S. H. Engine, 10½ x 12 in. Armington & Sims.

A. V. KAISER & CO.,

223 So. 3d St., Philadelphia.

Brown & Sharpe

Epicycloidal

GEAR CUTTING CUTTERS.

Selling Out to Reduce Stock.

Discount from list 75%.

HILL, CLARKE & CO.,

BOSTON, MASS.

17 in. x 17 in. x 4 ft. Whitcomb Planer

FOR SALE, ALSO

No. 2 Brown & Sharpe Screw Machine with wire feed and all chucks to 1 in.
10 in. x 4 ft. Bancroft Engine Lathe, condition good as new.

For full particulars and price apply to
S. T. LUND, 130 High St., Boston, Mass.

Air Compressors For Sale.

2 16 x 16 x 16 Alland Air Compressors.
1 12 x 16 x 18 Dean Air Compressor.
W. J. CARLIN COMPANY,
610-511 Lewis Bldg., Pittsburg, Pa.
NEW YORK OFFICE.
514-515 Park Row Bldg., New York, N. Y.

INVESTMENTS

Are offered by J. H. Hillman & Son, Empire Building, Pittsburgh, Pa., in the following first-class properties:

BLAST FURNACES IN PENNSYLVANIA.

No. 1, capacity 300 tons daily, now running, making over \$5 per ton profit. Can be turned over promptly. Will pay half the cost this year.
No. 2, capacity 200 tons daily, now running with big profit.

LAKE SUPERIOR (Mesaba) IRON ORE Lands.

Ready for operation August 1st.

TWO HUNDRED COKE OVENS AND

Five Thousand Acres of Coal Lands in West Virginia.

FIFTY COKE OVENS AND COAL

Lands on the Main Line of Pennsylvania Railroad.

CONNELLSVILLE COAL LANDS

and Coke Ovens.

EIGHTY COKE OVENS AND CON-

nectsville coal in Connelleville region.

FIFTY THOUSAND ACRES OF COK-

ing coal adjoining Connelleville region. Nine foot vein in Fayette and Greene Counties, Pa. These lands offer the best investments now before the American public.

COAL MINING PLANT AND COAL

Lands in Virginia.

Capacity 25,000 tons per annum. Now shipping East and West. Modern electric equipment. Coal is like Pocahontas smokeless used in the United States Navy. Being exported.

FIFTY THOUSAND ACRES OF KEN-

tucky Coal and Timber Land.

At a low price.

WELL-KNOWN IRON PROPERTY IN

Kentucky

With well-developed ore mines and millions of tons of ore in sight and has also a large number of farms on the Cumberland and Tennessee Rivers. This property contains 40,000 acres and is a principality in itself.

MANUFACTURING PROPERTY IN

the Monongahela Valley.

THICK VEIN COAL IN THE MO-

mongahela Valley.

In the 3d, 4th, 5th, 6th and 7th pools of the Monongahela River.

SOMERSET COUNTY COAL LANDS.

In tracts of five, ten, twelve and seventeen thousand acres each, are cheap and are being sold rapidly to Eastern capitalists.

MANUFACTURING SITE AND COAL

Lands on the Allegheny River.

On the Allegheny Valley Railroad is splendid property capable of prompt development.

CANADIAN IRON ORE MINES IN

Operation.

A MODERN ROLLING MILL.

MANUFACTURING PROPERTIES

and sites in Pittsburgh and Allegheny Cities, Pa.

FIFTEEN THOUSAND ACRES OF

coal in Centre and Clinton Counties, Pa., on the Beech Creek Railroad, suitable for shipment East.

TEN THOUSAND ACRES OF COAL

on the main line of the Pennsylvania Railroad, containing four veins of coal, mostly above water. John Fulton, Mining Engineer of Johnstown, Pa., estimates over 80,000,000 tons of coal on this property. Will be sold cheap to a prompt buyer.

A FIRST-CLASS CHARCOAL BLAST

Furnace.

For full information address

J. H. HILLMAN & SON,

Empire Building,

PITTSBURG, PA.

BLOWER BARGAINS.

ROOTS', second hand, bought, sold or exchanged.

All my blowers are overhauled by expert blower machinists.

I do not advertise a "fake" list of blowers not in my possession; my stock is constantly changing.

Write for particulars and prices.

H. M. PAPWORTH,

Ground Floor, 109 Liberty St., New York City.

WANTED.

A Power Press to punch two 3 inch holes in No. 34 iron, 11 in. from edge to centre. Press must have throat 11 in. deep from center of dies.

DRAW C, Portchester, N. Y.

Second-Hand Machinery.

LATHES.

60 in. Henley Pulley Lathe.
36 in. Streit Pulley Lathe.
30 in. x 14 ft. Fitchburg, compound rest.
28 in. x 16 ft. Putnam, compound rest.
24 in. x 12 ft. Putnam, compound rest.
24 in. x 10 ft. New Haven.
18 in. x 8 ft. Fitchburg, compound rest.
16 in. x 8 ft. Blaisdell, rise and fall rest.
10 in. x 4 ft. Bench Lathe, screw cutting, with compound rest and spring chucks.

PLANERS.

33 in. x 33 in. x 10 ft. Cincinnati, two heads, practically new.
36 in. x 12 ft. Hewes & Phillips.

PUNCHES AND SHEARS.

Heavy Geared Punch, Tod Co.
Long & Allstatter "C" Punch, very heavy.
Toledo Geared Press, power feed rolls.
Ferracute Tube Drawing Press.

SHAPERS.

12 in. Steptoe Crank.
24 in. Hendey Friction, power feed in head.
26 in. Smith & Mills.

MISCELLANEOUS.

10 ft. Alfred Box Radial Drill.
25 in. stroke Giant Key Seater.

Send for complete list of Second-hand Machinery.

MARSHALL & HUSCHART MACHINERY CO.,

62-64 S. Canal St., Chicago, Ill.

19 S. Water St., Cleveland, O.

510 Johnson Building, Cincinnati, O.

FOR SALE.

A large quantity of Ivory Button Machinery, Laundry Machinery and Printing Presses, one large size Ames Gear Cutter, Turret and Fox Lathes, Die Sinking Machine, Profiling Machine, Engine Lathes, Planers and Steam Engines and Boilers.

HANNAN & FINTON,

Springfield, Mass.

FOR SALE.

Two No. 2 Brown & Sharpe Plain Grinding Machines. For prices and particulars apply to

THE THOMAS & LOWE MCHY. CO.,

MACHINERY, TOOLS AND SUPPLIES.

PROVIDENCE, R. I.

BARGAINS.

One 16 in. x 24 in. Penna. Iron Works Engine, practically new.
One 14 in. x 22 in. Hor. Cut-off Engine.
One 7 in. x 10 in. Double Cylinder Double Drum Hoisting Engine and Boiler.
One 7 in. x 10 in. Single Cylinder Single Drum Hoisting Engine and Boiler.
Corliss, Automatic and Plain Slide Valve Engines.
Hor. and Vertical Boilers, all descriptions.

LOVEGROVE & CO.,

143-145 N. Third St., Phila., Pa.

Have For Sale.

New Corliss Engines, Simple, Compound and Condensing, sizes ranging from the smallest up to a 1000 H. P. Now ready for delivery, one 18 x 42 right hand and one right hand and left hand 14 x 36. Don't fail to write me before placing order, as prices cannot be duplicated.

J. R. WENDOVER,

206 West Street, New York City.

FOR SALE

Two 14-in. Schutte Condensers with automatic free exhaust valves and strainers. We have used these, each connected to a single cylinder blowing engine, 43 in. steam and 84 in. air cylinder, 5 ft. stroke, with very good results. Machines are as good as new and are displaced by a central condensing plant and can be seen at our plant at Brier Hill, Ohio. Will be sold cheap for immediate delivery.

YOUNGSTOWN STEEL CO.,

Youngstown, O.

MACHINERY BARGAINS.

Must Be Sold At Once.

1 14 x 5 Lodge & Shipley Lathe, practically new.
1 16 x 6 Blaisdell Lathe.
1 30 x 14 New Haven Lathe, comp. rest, fine.
1 40 x 6 Turret Chucking Lathe.
1 25 lb. Justice Hammer.
1 Bolt Cutter, 1 in. capacity.
2 Speed Lathes.
1 90 in. full Automatic Springfield Knife Grinder.

RACINE MACHINERY CO., Racine, Wis.

BARGAIN.

One 4500 lb. Bement Double Frame Steam Hammer.

Guaranteed good as new.

McDOWELL, STOCKER & CO.,

59 and 61 So. Canal St., Chicago, Ill.

READ CAREFULLY.

For Sale-Bargains.

40 H. "Otto" Gas Engine	.....	\$400
20 H. "Otto" Gas Engine	.....	300
10 H. Sterling, Charter Gas Engine	.....	300
14 x 30 Slide Valve Engine	.....	300
25 H. "Russell" Horizontal Steam Engine	.....	100
6 H. Upright "Kriebel" Engine	.....	60
50 H. Horizontal Tubular Boiler	.....	225
26 H. Portable Engine and Boiler	.....	150
6 H. Upright Engine and Boiler, NEW	.....	110
60 in. "Huyett & Smith" Ventilating Fan	.....	40
No. 1 "Sturtevant" Blower	.....	12
12 in. Upright Drill Press	.....	15
300 H. "Austin" E. Heater	.....	120
100 H. "Murphy" Pressure Heater	.....	75
80 H. "Kroeschell" E. Heater	.....	50
34 x 10 "Putnam" Engine Lathe	.....	350
Complete Belt Power Elevator	.....	110
66 in. x 30 in. Steel Rim Double Arm Pulley	.....	25
30 in. x 30 in. Steel Rim Friction Clutch Pulley	.....	25
28 in. x 10 in. Steel Rim Friction Clutch Pulley	.....	20
15 H. Firebox Horizontal Boiler	.....	85
20 H. Firebox Horizontal Boiler	.....	100
20 H. Center Crank Engine	.....	90

All guaranteed.
PARADOX MACHINERY CO., 181 E. Division St., Chicago.

PARTIAL LIST OF

SECOND-HAND MACHINERY

IN STOCK.

1 150 H. P. Buckeye Automatic Engine.	
1 125 " " " "	
1 80 " Baker " "	
1 80 " Atlas " "	
1 30 " Payne " "	
1 30 " " " "	
2 120 " 66 in. x 18 ft. Tubular Boilers.	
1 80 " 60 in. x 16 ft. " "	
1 75 " 54 in. x 18 ft. " "	
1 60 " 54 in. x 14 ft. " "	
1 12 x 12 x 10 Worthington Duplex Pump.	
1 12 x 7 x 12 Smith-Valle Duplex Pump.	
1 4 x 10 x 14 Knowles Pattern Single Pump.	
2 No. 6 Morris Machine Works Centrifugal Pumps,	
and a large number of smaller engines, boilers,	
pumps, etc.	

RAINIER & WILLIAMS,

63 So. Canal Street, Chicago, Ill.

Mill Engines.

1 94 in. & 38 in. x 60 in. Tandem, Allis, Tangye frame.	
1 18 in. x 42 in. Allis Corliss Condensing, wheel 18 ft diam., 22 in. face.	
1 16 in. x 42 in. Allis Corliss.	
1 16 1/2 in. x 25 in. x 15 in., Cross Compd. Armington & Sims.	
1 18 in. & 30 in. x 16 in. Westinghouse comp'd.	
3 16 in. & 27 in. x 16 in. Westinghouse comp'd.	
1 13 in. x 12 in. N. Y. Safety Automatic.	
2 13 in. x 14 in. Watertown	
1 14 in. x 13 in. Armington & Sims	
1 15 1/2 in. x 16 in. N. Y. Safety	
4 16 in. x 16 in. Ball	
2 16 in. x 16 in. Cooper	
1 18 1/2 in. x 18 in. McIntosh-Seymour	
5 18 1/2 in. x 18 in. Ideal High Speed Auto.	

2 40 in. x 72 in. International Power Co. Corliss Engines. Shafts 30 in. dia., 8 ft. between center of bearings. Wheels 24 ft. dia., 50 ton. 1 Right hand, 1 Left hand.

BOILERS.

2 375 H. P. Sterling Water Tubes for 150 lbs.	
2 175 H. P. " " " "	
2 300 H. P. National " " " "	125 "
3 72 in. x 16 ft. Return Tubulars	120 "
2 72 in. x 20 ft.	

CONDENSERS.

1 600 H. P. Snow Condenser.	
3 325 H. P. Davidson Condensers.	

Rossiter, MacGovern & Co.,

Electrical and Steam Machinery.

141 BROADWAY, N. Y. Factory, Brooklyn.

SEND FOR CATALOG.

Engine Bargains.

30 x 72 Hamilton Corliss.
30 x 72 Harris Condensing Corliss.
24 x 48 Hamilton Corliss.
30 x 48 Hamilton Corliss.
18 x 42 Harris Corliss.
16 x 42 Fraser & Chalmers Corliss.
15 x 24 Watertown Automatic.
14 x 30 Cummer 4 valve Automatic.
13 1/2 x 26 Buckeye Automatic.
12 x 22 x 18 Payne Tandem Compound Automatic.
12 x 24 Cooper Slide Valve.
12 x 30 Mansfield Slide Valve.
12 x 18 Slide Valve.
10 1/2 x 12 Phoenix Automatic.
10 x 12 Slide Valve.

The above are all in first-class condition and ready for shipment.

A. L. DAWSON & CO.,
27-31 W. Washington Street, Chicago, Ill.

For Quick Delivery.

SINGLE VERTICAL PUNCHES.

42 in. throat, 1 1/2 in. through 1 1/2 inch plate.
30 in. throat, 3/4 in. in 1/2 inch.
24 in. throat, 3/4 in. in 1/2 inch.

SPLITTING SHEARS.

30 in., two 11-16 in. holes in 1 in. metal; for bridge work.
For 3/4 in. and 1/2 in. plate.

DOUBLE ANGLE SHEAR for 4 x 4 x 3/4 in. angles.

Plate-edge Beveling Shear, for 3/4 in. plate.
Gate Shear and Multiple Punch, 78 in.

HORIZONTAL PUNCH, 6 in. throat, 3/4 in. through 3/4 in.

BENDING ROLLS, 100 in., for 1 1/2 in. plate.

Hand Spacing Table, 8 ft.
Boiler Makers' Flanging Clamps, 10 ft.
Steam Riveter, 6 1/2 ft. gap.
Plate Planer, 6 ft. cut.
Duplex Vertical Engines, 9 x 9.

HILLES & JONES COMPANY,
Wilmington, Delaware.

Desirable Machine Tools.

1 28 in. Lathe, 15 ft. between centres.
1 30 in. Lathe, 12 ft. 6 in. between centres.
1 42 in. Lathe, 13 ft. between centres.
1 32 in. Planer, 8 ft. bed.
1 24 in. Gould & Eberhardt Shaper with Rack Cutting Attachment.
For Sale by

W. C. Johnson & Sons Mach'y Co.,
513 N. Second St., St. Louis, Mo.

Power Presses.

4 No. 74 1/2 Bliss geared.
2 No. 75 1/2 Bliss geared.
1 No. D75 Ferracute geared.
1 No. 50C Toledo geared.
1 No. 58C Toledo geared.
3 Small Presses.
1 Drop Press, 175 lbs., four poppet.
1 No. 4 Long & Allstatter Punch, 7 in. throat.

10 Shapers.
58 Lathes.
135 Screw Machines.
98 Drill Presses.
12 Engines.
8 Planers.
55 Milling Machines.

Write for prices.

Geo. H. Bowler, Williamson Bldg.,
CLEVELAND, O.

Plate Planer.

We offer for immediate delivery,

1 16 ft. PLATE PLANER,
made by William Sellers &
Company, which is in first-
class condition.

Delivery in Central Penn-
sylvania.

WILLIAM A. READE & CO.,

216-217 American Trust Bldg., Cleveland, Ohio.

ENGINES AND BOILERS, FOR SALE.

2 36 in. x 72 in. Wheelock Corliss Engines, each with 50 ton flywheel, one engine bushed to 28 inches.
2 Hazelton Boilers 500 H.P. ea., with automatic stokers.
1 " Boiler 75 H.P.; 35 H.P. Vertical Eng.
2 60 in. x 30 ft. Boilers, 30 6 in. flues, all appurtenances.
4 32 in. x 20 ft. " 14 6 in. " "
1 23 in. and 1 25 in. Drill Press (new). No. 9 Sturtevant Cupola Blowers.
1 Totten & Hogg 36 in. Roll Lathe, 12 ft. centers, and lot turning tools.
Allen Belted Air Compressor, 50 ft. per minute.
2 Otis Elevator Engines, 7 in. x 10 in. cylinders.
ST. LOUIS STEAM FORGE & IRON WORKS,
Main and Miller Sts., St. Louis, Mo.

Second-hand Tools

For Immediate Delivery.

1 800 lb. Merrill Drop Hammer.
1 14 in. x 60 in. Pratt & Whitney Shaping Machine.
1 12 in. x 60 in. Bement Shaping Machine.
1 10 Pratt & Whitney Tool Room Lathe.
1 No. 3 Stiles Punching Press.
1 No. 3 Fowler Press.
1 54 in. x 19 ft. Planer, double head.
1 60 in. Heavy Radial Drill, 5 inch spindle.
1 Small Horizontal Boring and Drilling Machine, Bement.
1 12 H. P. Otto Gas Engine.
1 No. 1 1/2 Pratt & Whitney Hand Milling Machine.
1 No. 2 1/2 Newton Duplex Milling Mach.
1 No. 5 Cleveland Auto. Screw Machine.
1 Lodge & Davis Screw Machine, 2 in.
1 No. 2 Jones & Lamson Screw Machine.
1 36 in. Hydraulic Wheel Presses.
1 16 in. Slotting Machine.

U. Baird Machinery Co.

123-125 Water St., 124-126 First Ave.,
PITTSBURGH, PA.

FOR SALE.

We have lately purchased the site of the Pacific Rolling Mills in San Francisco and are now equipping same with a modern shipbuilding plant. In consequence, we have on hand and for sale, at a low price, the following:

One 8 inch, one 10 and one 12 inch Guide Mill, each complete with housings, guides, boxes, carriages, brasses, clamp bars, tongs, etc., etc., with full sets of roughing and finishing rolls.

One 18 in. Bar and one Rail Mill.

One 28 in. Beam Rolling Mill.

Also with full sets of Rolls for each mill.

One Charging Machine.

Also one Roll Turning Lathe, double header, for turning two rolls at same time. Bed 42 feet long by 5 ft. 6 in. inside way. Swing 3 ft. 9 in.

Four Tool Rests.

Four Roll Neck Rests.

Two Clutches for driving work.

In first-class shape with necessary tools for same.

Also one Roll Turning Lathe, double header; turns rolls 6 in. to 18 in. inclusive, two at same time. Wood Frame, 21 feet long and four feet six inches wide. Swing 4 feet. Iron guides. Tool rest and carriage fastened to wood foundation. Chucks for all sizes of rolls. Tools, countershafts, etc., all complete.

We have also quite a number of boilers and engines that have been used throughout the rolling mill, which we will sell at a low figure. Write and send for circulars.

RISDON IRON AND
LOCOMOTIVE WORKS,
San Francisco, Cal.

Where to Locate.

Manufacturers using iron, steel or wood will find the best locations for successful plants along the

SOUTHERN RAILWAY.

These locations lead in cheap raw material, cheap, contented and desirable labor, cheap fuel and in good facilities for marketing products. Opportunities now open for establishing new plants are fine and should be investigated. Other investments will prove profitable in the South.

M. V. RICHARDS,

Land and Industrial Agent, Southern Railway,
WASHINGTON, D. C.

STEEL SCRAP WANTED.

7 1/2 in. round or larger. 8 in. long or longer or equal area of any other shape.

NORTHWESTERN SUPPLY CO.,
Duluth, Minn.

For Sale Cheap Before Removal.

One Corliss Engine, 16x38, made by Hewes & Phillips. Two Return Tubular Boilers, 60 x 16. One 200 H. P. Berryman Heater. Can be delivered in January. It can be seen at Kertcher & Co.'s, Elmira, New York.

Two Horizontal Return Tubular Boilers, 48 in. x 14 ft. Each boiler has 26 4 in. tubes. Boilers are in A1 condition.

One 65 in. x 16 ft. Horizontal Return Tubular Boiler, has 82 3 in. tubes and is in A1 condition.

We also have 350 tanks of different sizes.

WM. ECKBOLDS' SONS,
711 E. Girard Ave., Philadelphia.

MACHINERY.

SECOND-HAND, FIRST-CLASS ORDER.
800 lb. Pratt & Whitney board lift automatic Drop Hammer.

No. 7 Jarecki Pipe Machine.
Garvin Single Spindle Profiler.
14 ft. Boiler Plate Planer.
22 1/2 in. Barnes Drill, Back Gearing.
16 x 16 x 4 ft. Hendey Planer.
20 x 20 x 4 New Haven Planer.
28 x 38 x 8 ft. Cove Planer.
36 x 36 x 12 ft. Wilson Planer, with two heads.
30 x 30 x 8 ft. Whitcomb Planer.
14 in. Prentice Drill with chuck.
20 in. Snyder Drill, power feed, back gear.
P-4 Ferracute back geared press.
14 in. Brown & Sharpe Screw Machine, without wire feed.

16 1/2 in. Screw Machine with Chard turret, Davis & Egan M. T. Co.

No. 1 Sensitive Drill Power Feed, Norton & Jones.
No. 3 Garvin Miller without arm, vise or vertical fixture.

No. 1 Cincinnati Full Universal Milling Machine.
No. 3 Garvin Hand Milling Machine.
No. 1 Davis Key-Seater.

14 in. x 8 ft. Perkins Engine Lathe, plain rest,
14 in. x 6 ft. Lodge & Davis Engine Lathe with compound rest, 30 in. x 22 ft. New Haven Mfg. Co. Lathe with compound rest.

Write us for any machinery wanted, or if you wish to exchange or sell.

C. C. WORMER MACHINERY CO.,
Ft. of Shelby Street, Detroit, Mich.

FOR SALE.

14 in. x 48 in. Allis-Corliss Engine.
150 H. P. Cross-comp. Armstrong & Sims Auto. Eng.
3 x 10 and 8. Vertical Engine.
9 x 12 Nagle Engine, center crank.
11 x 18 H. S. & G. Plain Slide Valve Engine.
12 x 18 H. S. & G. Plain Slide Valve Engine.
12 in. x 36 in. Babcock and Wilcox Auto. Engine.
12 in. x 16 Center Crank Slide Valve Engine.
12 in. x 7 in. x 10 in. Worthington Duplex Pump.
Also a number of smaller Engines and Pumps.

THE E. H. WACHS CO. 133 Indiana St., Chicago.

BARGAINS IN MACHINERY.

One pair of 14 x 24 mine HOISTING ENGINES.

CAST IRON PIPE, from 6 in. up to 16 in. in diam.

WROUGHT IRON PIPE, all sizes up to 6 in. diam.

One 30 in. gauge LOCOMOTIVE and 17 30 in. gauge CARS.

GRANT & WILLIAMS, Park Row Bldg., N. Y.

FOR SALE.

20 in. x 60 in. Allis Corliss Engine.
18 in. x 42 in. Allis Corliss Engine.
16 in. x 24 in. Russell 4-valve Automatic Engine.
13 in. x 12 in. Erie Ball Automatic.
20 H. P. Fairbanks-Morse Gas Engine.

WANTED.

2 75 to 100 K. W. 125 volt Dynamo.

STANDARD MACHINERY & EQUIPMENT CO.,
Rose Bldg., Cleveland, Ohio.

BOILER WORKS

With the latest machinery and equipment, well located and established. Good reason for selling. Address

"H. H. G.,"

Care The Iron Age, New York

FOR SALE.

One 24 in. Blade Lewis Foundry and Machine Co. Billet Shear. Will cut 6 in. square cold.

W. J. CARLIN COMPANY,
Lewis Bldg., Pittsburg, Pa. New York Office,
514-515 Park Row Bldg., New York, N. Y.

Harrisburg, Pa.

An Ideal Shipping Point

Have you ever experienced the need of a central distributing point for the eastern field? Many manufacturers now carry stocks of goods here. The best located man often gets the trade. You can RENT Large, Centrally Located Warehouses with (tenants, of us, or you can BUY our former plant (we now occupy our new factory), well located for manufacturing or warehouse purposes. HARRISBURG FOUNDRY AND MACHINE WORKS

FOR SALE.

SPECIAL ENGINES.

- 1 14 in. x 20 in. (Vertical) Slide Valve.
- * 14 in. x 30 in. Keystone Corliss (Brand new).
- * 11 in. and 19 in. x 24 in. Tandem Comp'd "Buckeye" (latest type) with condenser.
- * 1 23 in. x 48 in. Geo. H. Corliss make.
- * 1 24 in. x 36 in. Mackintosh, Hemphill & Co.
- * 1 35 in. x 60 in. Tangye Bed type.
- 1 Crane Elevator Co. Modern Elevator Engine.

BOILER.

- 1 Horizontal Tubular, 72 in. x 16 ft., with 84 3/4 in. tubes, approved for 100 lb. pressure, complete.

SHAFTS and PILLOW BLOCKS.

- 15 Very fine forged Shafts, finished all over, 10 in. diam. to 16 in.

FLY WHEELS.

For Balance and for Belts.

SMOKE STACK.

- Very fine steel self-supporting stack, 64 in. diam., 100 ft. high, with base casting, ornamental top and ladder.

PUNCH.

- 1 Ferris & Miles make.
- 1 in. hole through 1 in. iron; 23 in. throat.

SHEARS.

- 1 New Alligator Shear with capacity up to 2 1/2 in. Cold Billets, or for Scrap Cutting. Knives 14 in. long.

LOCOMOTIVES, New and Second hand.

* Signifies Right-hand.

B. M. EVERSON.

German Nat. Bank Bldg. (6th and Wood),
PITTSBURG, PA.

Sales Agent for
Baldwin Locomotive Works, Phila.

Foundries for Sale.

Foundry site with excellent water power at Medina, N. Y.

Fine foundry buildings at Allentown, Pa., with railway siding.

Fine foundry buildings at Sing Sing, N. Y., with rail and water facilities.

Address "NASSAU,"
care The Iron Age, New York.

FOR SALE.

Entire plant for manufacturing
WOVEN WIRE FENCING,
consisting of patent and looms for
making railroad, farm, garden, hog
fencing and poultry netting of a new
style. Also raw and manufactured
stock on hand if desired. Address

"WOVEN WIRE,"

care THE IRON AGE, New York.

WANTED.

To represent manufacturers of Staple or Heavy
Hardware, Iron or Steel, Nuts and Bolts, &c., &c.
Either by carrying a stock in New York City, or by
selling direct from factory. Located in the centre
of the Hardware district, we have ample storage
room, office and large sales room on GROUND
floor. Address

CHAS. J. STEBBINS & CO.,
108 Reade Street, New York City.

GAS and GASOLINE ENGINES.

All sizes and makes, from 1/4 to 35 horse power,
new and slightly used. Some modern makes sold
for much less than first cost, older types rebuilt at
our own works and sold fully guaranteed very
cheap. State your wants.

Machinery of all descriptions bought, sold and
exchanged.

CALLESON MOTOR COMPANY
270 West St., New York City.

FOR SALE.

- 1 DA Iron Split Pulley, 18 ft. x 41 in. x 10 in. bore.
- 1 DA Iron Split Sheave, 12 ft., 18 1/2 inch grooves, 10 in. bore.
- 1 DA Solid Iron Pulley, 5 ft. x 42 in. x 5 1/2 in. bore.
- 6 Housings for 9 to 12 in. rolls.
- 1 Triple Continuous Housing, for 9 in. rolls.
- 1 Triple Continuous Pinion Housing, with or without pinions. Address

"BOX No. 8,"
care The Iron Age, Fisher Building, Chicago, Ill.

FOR SALE.

- 2 Vertical Corliss Engines, 30 in. x 36 in.
- 1 Horizontal Slide Valve Engine, 20 in. x 32 in.
- 1 Tubular Boiler, 60 in. x 18 ft.
- 1 " " " 48 in. x 18 ft.
- 1 " " " 48 in. x 16 ft.

All in good condition. At our mill at Peoria, Ill.
2 New Cylinder Boilers, 42 in. x 40 ft.
At our mill, Brazil, Indiana.

REPLIC IRON & STEEL COMPANY,
Chicago, Illinois.

BARGAINS.

- 1 No. 1 Brown & Sharpe Universal Milling Machine
- 1 Semi-Universal Miller, Worcester Machine Co.
- 1 26 x 26 x 10 Schenk Planer.
- 1 18 x 18 x 5 with chuck.
- 1 16 in. D. T. Q. Gould & Eberhardt Shaper.
- 1 12 in. Shaper, heavy machine, Michaels.
- 1 5/4 in. Van Nostrom Shaper.
- 1 20 in. heavy Drill, Gould & Co.
- 1 13 in. Sensitive Drill and Chuck, W. & R.
- 1 36 in. heavy Bk. Gd. Drill, Massinet Mfg. Co.
- 2 No. 2 Garvin Screw Machines.
- 1 Gray Screw Machine.
- 1 13 in. x 6 ft. bed, No. 6 Barnes Engine Lathe.
- 1 22 in. x 16 ft. Engine Lathe.
- 1 24 in. x 12 ft. " " New Haven Mach. Co.
- 2 24 in. x 10 ft. " " " " " "
- 2 20 x 8 ft. " " " " " "

chain feed, \$30.00 each.

- 1 18 x 8 ft. " " Michaels.
- 1 16 x 6 ft. " " Blaisdell.
- 1 15 x 6 ft. " " Star Tool Co.
- 1 14 x 6 ft. " " Pratt & Whitney.
- 1 Bliss Punch, 2 in. stroke.
- 1 Double Punch, 5/4 in. stroke.
- 1 Graves Hydraulic Elevator and Car, complete, capacity 3,000 lbs.
- 12 x 3 Gould Triplex Power Pump.
- 1 100 H.-P. Sterns Tubular Boiler, complete, flush front, fitted with Hawley Down Draft.

MACHINISTS' SUPPLY CO.,
Rochester, N. Y.

TWIST DRILLS.

For Sale. A lot of about 2000 new
Twist Drills, straight and taper shank.
Size from 1/4 in. to 2 in. diameter gradu-
ating by 64th. Will sell very cheap.

M. P. COLEMAN,
95 Haverhill St., Boston Mass.

BOILERS and ENGINES FOR IMMEDIATE DELIVERY.

- 1 7 x 10 "C. C." Engine.
- 1 8 x 12 " " "
- 1 10 x 12 " " "
- 1 12 x 16 " " "
- 1 6 x 6 Vertical Engine.
- 1 48 x 9 Vertical Tubular Boiler.
- 1 35 H. P. Portable Boiler.
- 1 60 H. P. " " "

W. J. CARLIN COMPANY,
610, 611 Lewis Bldg., Pittsburgh, Pa.
NEW YORK OFFICE:
514, 515 Park Row Bldg., New York, N. Y.

FOR SALE.

Tools lately in use in Boiler Manuf'g Plant.

- 1 40-ton 36 in. Gap Hydraulic Portable Riveter.
- 1 set 30 ft. Niles Rolls.
- 1 13 in. x 22 in. x 13 in. Westinghouse Engine
- 1 18 in. x 5 1/4 in. x 18 in. Barr Pump for 500 lbs. pressure.

For additional information, address

ESTATE OF WM. G. WARDEN,
1012 Witherspoon Bldg., Philadelphia.

SECOND-HAND MACHINES FOR SALE.

- 32 in. by 20 ft. Lathe.
- 14 in. by 5 ft. Lathe.
- 48 in. by 40 in. 24 ft. Planer, 3 heads.
- 30 in. by 25 in. 5 ft. Planer, 1 head.
- 35 in. by 47 in. 12 ft. Planer, 1 head.
- 28 in. Drill, B. G., P. F., sliding head.
- 32 in. Drill, B. G., P. F., sliding head.
- 6 in. Shaper.
- 16 in. by 24 in. Milling Machine.
- No. 9 Long & Allstatte Shear, 30 in. Throat, 20 in. Shear.

W. R. COLCORD MACHINERY CO.,
423-425 N. Second St., St. Louis, Mo.

BLOWERS.

- Root Blowers Nos. 1/4, 1/2, 1, 2, 3, 4, 5 and 6.
- Baker " " 4, 4 1/2, 5 and 7.
- Sturtevant Blowers Nos. 2, 3, 5 and 6.

All thoroughly overhauled and guaranteed in good
working order.

Write for particulars and get my special prices.

All makes of Blowers bought, sold and exchanged.

A. ASHER, 2d Floor, 109 Liberty St.,
NEW YORK.

WANTED.

One Double Punch and Shear,
Hilles & Jones style preferred (No. 2
or No. 3). Throat not less than 15
in. Must be in good condition.
Quote bottom price with full de-
scription to

The WM. F. REMPIE CO.,
Ornamental Iron Works, Reading, Pa.

Rebuilt Motive Power For Sale.

We are the largest dealers on
earth of rebuilt Machinery. Our
plant covers over a million feet of
space. We cover all sales by a
binding guarantee. We offer the
following for sale:

ENGINES.

- No. A 355 1 12 x 16 horizontal box bed, side crank.
- No. A 357 1 10 x 14 side crank.
- No. A 359 1 16 x 36 patent gear valve motion, rated 150 H. P.
- No. A 376 1 15 H. P. Westinghouse, Jr.
- No. A 380 1 11 x 18 side crank, Sinker, Davis & Co.
- No. A 382 1 4 1/2 x 10 side crank.
- No. A 419 1 8 x 10 automatic Atlas.
- No. A 438 11 x 16 x 16 McEwen tandem compound.
- No. A 440 9 x 16 Rice automatic.
- No. A 441 16 x 36 Corliss.
- No. A 443 50 H. P. Raymond gas or gasoline.
- No. A 445 10 x 22 side crank.
- No. A 476 10 x 24 side crank, Greenwall.
- No. A 479 10 x 20 side crank.
- No. A 480 5 x 12 side crank.
- No. A 482 150 H. P. Poppet valve motion.
- No. A 485 10 x 22 side crank.
- No. A 486 11 1/2 x 14 center crank.
- No. A 487 10 9 x 12, manufactured by Geo. W. Tift & Sons, Buffalo, N. Y., horizon-
tal box bed, center crank, reversible
valve motion and geared with the
latest appliances.
- No. A 501 12 x 16 side crank, F. C. Wells.
- No. A 502 2 8 x 16 side crank, left hand.
- No. A 503 16 x 24 side crank.
- No. A 504 6 x 8 side crank.
- No. A 505 6 x 12 side crank.

And 200 others.

BOILERS.

Our stock of boilers includes horizontal tubular,
vertical, fire box, &c. We can supply you with
anything you may need from 1 to 1000 H. P. We
still have a few of the 60 x 16, 60 x 18 and 54 x
16 horizontal tubular boilers that we purchased
from Armour & Co. Let us know your wants.

STEAM PUMPS.

We have in stock all kinds of steam pumps and
will be glad to furnish you our complete list on
application.

LATHES.

Ask for our complete stock list of lathes and
planers.

FANS, BLOWERS, ETC.

Over 200 different items on hand in the above.
State your wants.

EMERY GRINDERS.

We have in stock and can make to order any
size wanted.

SUPPLIES.

We are the largest dealers in the country on
belting, shafting, hangers, pulleys, hardware,
rope, pipe and iron roofing. Our prices will inter-
est you.

Ask for Complete Catalogue
No. 78.

It will pay you to get our estimates on
Machinery and Supplies before making
contemplated purchases. We are con-
stantly buying entire stocks of General
Merchandise at Sheriffs' and Receivers'
Sales.

Chicago House Wrecking Co.,

West 35th and Iron Sts.,

CHICAGO.

Special Notice to Buyers.

The few items herein listed represent only a small portion of the machinery of a large Sugar Refinery being dismantled, and for the disposal of said machinery the advertiser is sole sales agent.

Boilers.

- 12 73 in. Horizontal Tubular Boilers, complete.
- 1 66 in. Horizontal Tubular Boiler.
- 1 60 in. Horizontal Tubular Boiler.
- 6 250 horse Babcock and Wilcox Safety Water Tube Boilers.

Engines.

- 2 18 in. heavy duty dble. slide valve engines, one built by Wright, and one by Fishkill Engine Co., having fine band wheels and heavy W. I. pans to protect wheel pit from water.
- 4 14 in. x 24 Slide Valve, made by A. and F. Brown.
- 1 12 in. Atlas Engine.
- 1 10 x 15 Dble. Cyl. Engine.
- 2 8 in. Single Cyl. Engines.

Hoisting and Elevator Engines

- 2 8 in. Cyl. Vertical. (Drums).
- 2 2 Tons Elevator Hoisting Engines, direct connected.

Pumps.

Guild & Harrison Salt Water, Hot Water and Cold Water Pumps, from 24 in. cylinder down.

Tanks.

Large, Round and Square, also Jacket Tanks (copper bottom).

Electrical Machinery.

- 1 100 K. W. Direct Connected Outfit.
- 1 50 K. W. " " " "

Filters: Bone Black and Water.

Sugar Making Machinery, complete equipment. Centrifugal Machines, Vacuum Pans, etc., Shafting and Pulleys and General Equipment.

JOHN E. BEGGS,
47 Cedar St., N. Y. C.

Telephone Call 2478 John.

FOR SALE.

A complete Wire Nail Plant, consisting of German Spring Machines with the American Improvements, etc.

R. S. ARMSTRONG & BRO.,
Atlanta, Ga

FOR SALE.

Four trains of Plate Rolls, One 9 ft. Fly Wheel, new 7 in. bore; weight, 6,000 lbs.

One Rod Straightening Machine, built by the Medart Patent Pulley Co., for straightening Rods up to 3 in. diameter and 25 ft. long.

A lot of extra cold and hot plate rolls, new.

HENRY A. HITNER'S SONS,
Gaul and Sergeant Streets, - PHILADELPHIA.

Manufacturers of Staples and Specialties in Hardware, Tools, House-Furnishing Goods and Kindred Lines, who desire Direct Representation in Great Britain and Continental Europe by Established Firm of Manufacturers' Selling Agents, should address "STAPLES," care The Iron Age, New York.

Manufacturing Site for Sale at Bellaire, Ohio.

Two three-story brick heavy buttressed factory buildings, one 50 x 120, the other 35 x 120 feet in size, with a contiguous plot of land, 120 x 175, for enlargements.

Locality has abundance of natural gas and besides is in the midst of extensive coal fields.

Shipping facilities are the Baltimore & Ohio, the Pennsylvania, the Cleveland, Lorain & Wheeling, connecting with the N. Y. Central, the Ohio River Railroad, the Wheeling and Lake Erie, the Bellaire, Zanesville & Cincinnati, and the Ohio River itself. Bellaire has a population of 10,000, has water works, electric lights, trolley lines, natural and artificial gas, paved streets, good schools and churches. If desired, the owners will interest themselves in any promising industry proposing to occupy this site.

Address A. P. TALLMAN,
First National Bank, Bellaire, Ohio.

PIG IRON AT \$8.00 A TON.

I control and offer for sale a tract of land containing within its boundaries all necessary for the manufacture of Pig Iron except the coke, including ample water supply and furnace site. The ores are of different qualities, in never ending supply and cheaply mined. The stone is in inexhaustible quantity, of good quality and can be put at furnace site at nominal cost. Furnace site is alongside railroad. Coke can be had at 10-12 per cent. selling price No. 2 foundry iron, Philadelphia. I am prepared to prove that iron can be made there at cost inside \$8.00 per ton. Freight to New York will not exceed \$2.75 per ton, and to tidewater considerably less. Property contains some 7,000 acres and has open on it seven different banks of ore of varying qualities. This is a most unusual opportunity to obtain a magnificent location for the manufacture of foundry or basic pig iron. For further particulars address

"PIG IRON"
care The Iron Age, New York.

FOR SALE.

Henry Martin Brick M'ch'e and Pug Mill, cap. 25,000 daily at \$300.
Two (2) 75 H.P. Hor. Tubular Boilers, at \$200 each.
One Howe 20 ton Track Scale at \$80.

SCHULTZ & CO.,
14 South Broad St., Philadelphia.

Thomas A. Green,
92 and 94 Plymouth St., Brooklyn.

Scrap Iron Steel & Metals

PURCHASED FOR CASH.
Correspondence Solicited.

EXPORT

Gentleman thoroughly acquainted with all branches of the Hardware trade and having offices and show-rooms in best position in the City of London, and also at Manchester, is visiting the States from December 25th to January 15th. He will be glad to communicate with any Hardware Manufacturer of good standing, not at present directly represented in Great Britain. Thorough representation guaranteed; six travelers always on the road in United Kingdom. Address "W," care The Iron Age, New York.

A GOLDEN OPPORTUNITY.

FOR SALE.

Complete Sugar Refinery.

Known as St. Cloud Sugar Mill.

Capacity, 600 Tons per day.

SABEL BROS.,
Jacksonville, - Florida.

FOR SALE.

Improved water power in the city of St. Catharines, Ontario, Canada, representing about 200 horse-power, 50 horse-power water wheel in position, and room for more in the penstock. St. Catharines has good railway facilities and is a large manufacturing center. A live concern employing a considerable number of hands would receive substantial encouragement from the Municipality. Apply to **WILLIAM CHAPLIN,** St. Catharines, Ont.

FOR SALE.

A profitable Hardware business, stock about \$14,000, consisting of Builders' Hardware, Stoves, Furnaces, Tinware, Paints, Oils and Glass, will be sold at a bargain if bought immediately, to close out a partnership. Address "G. M. S.," Box 1110, care The Iron Age, New York City.

PUBLIC SALE OF Complete Foundry Plant

situated on main line of Penn. R.R., between New York and Philadelphia. Lands, Buildings, Fixtures and Machinery of the New Brunswick Foundry Co., at New Brunswick, New Jersey, will be exposed to sale at public vendue on Tuesday, Jan 8th, 1901, at 2 P. M., at the office of the company, New Brunswick, N. J.

For particulars address

JOHN H. CONGER, Receiver.
New Brunswick, N. J.

\$26,000

HARDWARE STORE FOR SALE.

An excellent opportunity for two or three young men to combine, or for a party desiring a change to the best climate in the United States; business well established and growing. Stock consists of hardware, tools, guns, ammunition and stoves; modern fixtures, fine location. Address "HARDWARE," 3773 Meade St., Denver, Colorado.

Bargains.

Keystone Motor, 220 Volts, 12 amp., \$75.
8 x 15 Upright Hoisting Engine, \$300.
Hydraulic Elevator (good condition), \$250.
Factory Elevator, \$100.

WARNER ELEVATOR MFG. CO.,
Cincinnati, Ohio

WANTED.

A heavy Power Flange Punch and heavy Power Splitting Shears, capable of cutting sheets up to five-eighths or three-quarters inch thick. Must be in good order and cheap.

F. M. HICKS,
225 Dearborn St., Chicago, Ill.

FOR SALE.

A 1 stock of hardware in the best town in Southern Michigan. A bargain for cash. Address "HARDWARE," care The Iron Age, 1305 Fisher Bldg., Chicago.

WANTED.

A Draw Bench, 16 to 20 feet.
John W. Rapp,
311-327 E. 94th St., New York.

OLD CHINA and glass, flint lock arms, muskets, rifles, horse pistols, pocket pistols, old odd revolvers, swords, machetes, old knives, war, pioneer, historical and Indian relics, antiquities, and oddities. Price list free. **DAVIS BROS.,** Box B Diamond, Portage Co., Ohio.

FOR IMMEDIATE SALE.

An old established Hardware and Stove Store, Embracing Tinware, Plumbing, etc. Stock, \$10,000. Can be reduced. Good growing trade. Address "DRAWER 55," Watkins, N. Y.

WANTED.

3000 ft. 3 in., 3500 ft. 3 1/2 in., 3000 ft. 4 in. and 2000 ft. 5 in. second-hand Gas Pipe; 100 ft. 4 in. x 18 ft., 200 ft. 4 1/2 in. x 16 ft. and 200 ft. 5 in. x 16 ft. second-hand Boiler Tubes. **A. F. BARTLETT & CO.,** Saginaw (East Side), Mich.

E. BISSELL & CO.,

WHOLESALE

HARDWARE AUCTIONEERS,

12 Murray St. and 15 Park Place, N. Y.
Sales held weekly for the trade. Commissions solicited. We refer to the leading manufacturers and importers.

Water Pipe FOR SALE.

About 15,000 feet 20 in. Cast Iron Water Pipe made by R. D. Wood & Co., 170 lbs. to foot, in 12 ft. lengths, in first-class condition for re-use.

Will be sold in lots to suit.

FRANK SAMUEL,
Harrison Bldg., Philadelphia, Pa.

BERKSHIRE IRON YARD, H. H. ROGERS, Owner. Scrap Iron, Metals, Etc.

221-223-225 Housatonic Ave.,
BRIDGEPORT, CONN.
TELEPHONE.

SPOT CASH PAID FOR Scrap Iron and Steel

Give description, shipping point and lowest spot cash price.

F. GREINER, 406 Drexel Building,
PHILADELPHIA, PA.

Wagon Tires, STEEL OR IRON, RD. EDGE OR SQUARE. Angles Up To Four Inch. LOGAN IRON & STEEL CO., BURNHAM, PA. Buyers of Scrap for Cash.

I buy Iron and Metal Scrap and wish to hear from anybody having cotton ties, pipe, hoops, cast borings, wrought and steel turnings, boilers, cast scrap, etc. Also wrecks from fire, etc.

ROBERT M. CUNLIFFE,
1140-42 Washington Ave., Phila., Pa.

TELEPHONES 2440, 2441 AND 2442 BROAD.
B. NICOLL & COMPANY,
59 AND 61 WALL STREET, NEW YORK.
**WIRE RODS,
BILLETS.
IRON ORE AND MILL CINDER.
FOUNDRY, FORGE, BESSEMER and BASIC PIG IRON.
Steel and Iron Scrap for Open-Hearth Furnaces Bought and Sold.
Furnace Agents, Exporters and Importers.**

FOR IMMEDIATE DELIVERY. Angles, Beams, Channels, Plates, Tees, Zees, Bars.

5000 tons in stock. Moderate prices. Send for stock sheet and quotations.

STRUCTURAL DEPARTMENT, ILLINOIS STEEL CO.,

Designers, Manufacturers and Erectors of
Structural Iron Work, Dealers in Structural Materials.

50 Wabansia Ave., CHICAGO.

Relaying Rails, Scrap Iron, Steel and Metals

Bought and Sold.

ISAAC JOSEPH IRON CO.,
Swift Bldg., CINCINNATI, OHIO.
Monadnock Block, CHICAGO, ILL.
CORRESPONDENCE SOLICITED.

1000 TONS CHARCOAL IRON BROKEN SHELL.

Must Be Sold At Once.

M. SAMUEL & SONS,
Kent Ave. and North 2d St., Brooklyn.
Washington and Bethune Sts., New York.

BEAMS, CHANNELS, ANGLES, PLATES.

Eye Beams, from 4 ins. (7½ lbs.), to 20 ins. (65 lbs.)
Channels, from 4 ins. (5½ lbs.), to 15 ins. (33 lbs.)
Angles, from 1½ ins. x 1½ ins. x 3-16 in. to 6 ins. x 6 ins. x ½ in.
Angles, from 2½ ins. x 2 ins. x 3-16 in. to 6 ins. x 4 ins. x ½ in.
Zee Bars, 3 ins., 4 ins. and 5 ins.
Plates, 1½ ins. and over.
All material in 50-ft. lengths, or cut to specified lengths if desired. Send for detail stock list.
All material in stock, and will be shipped immediately on receipt of order.
Quotations subject to prior sale.

THE FOREST CITY STEEL & IRON CO.,
Cleveland, O.

WANTED. Scrap Iron and Steel.

Correspondence Solicited.
C. Botjer, 405 Newark St., Hoboken, N. J.

FOR SALE. Relaying Rails. Prompt Deliveries.

Standard and light sections, subject to inspection. Only prime relayers handled by this firm. Delivery Chicago, St. Paul, Kansas City, El Paso, Texas, Washington, D. C., and other points. For further information write to
BLOCK-POLLAH IRON CO.,
923-925 Marquette Bldg., Chicago.

WE BUY PLANTS, TO WRECK.

WANT RELAYS and SCRAP RAILS.
SCRAP BRASS, COPPER and METALS.

L. E. KENNEDY & CO.,
95 Liberty St., New York City.

Scrap Iron, Steel and Metals. New Jersey Iron & Metal Co., PATERSON, N. J.

Write us when you have Scrap to dispose of or want to buy.

Scrap Iron, Steel and Iron Rails

bought and sold by
M. J. & M. BLAKE,
10th Ave. and 15th Street,
New York City.
Telephone Call, 897 18th St.

JOHN LEONARD. MICHAEL BLAKE.
JOHN LEONARD & CO.
IRON AND STEEL SCRAP.
IRON AND STEEL RAILS, PIG IRON, ETC.,
220 Broadway.
ST. PAUL BUILDING, NEW YORK.
TELEPHONE, 975 CORTLANDT.
Correspondence Solicited.

The Morton B. Smith Co.,
243 FRONT ST., NEW YORK.
OLD METALS
of every description purchased for cash, also
SCRAP IRON and STEEL
in carload lots.
Correspondence solicited.

E. O. MILES, President. J. W. RUSSBY, Manager.
Scrap Iron and Old Metals.
ATLANTA JUNK CO.,
278 to 298 Marietta St., Atlanta, Ga.
CORRESPONDENCE SOLICITED FROM
BUYERS AND SELLERS.

FOR SALE RELAYING RAILS, Etc.

150 tons 56 lb., with Splices.
250 tons 40 lb., with Splices.
75 Box Cars, 50,000 lbs. capacity.
10 Flat Cars, 50,000 lbs. capacity.

MAY & SPALDING,
Atlanta, Ga.

FOR SALE. Relaying Rails.

35 tons of 35 lb. steel, with splices.
800 tons of 50 lb. steel, with splices.
500 tons of 56 lb. steel, with splices.
Tidewater delivery.

THE STEEL RAIL SUPPLY CO.,
100 Broadway, New York City.

WANTED. SCRAP STEEL.

Give description and price delivered our yard, Pottstown, Pa.

Donaldson & Newton, 421 Chestnut St.,
Philadelphia, Pa.

SCRAP IRON or STEEL WANTED.

E. B. LEAF & CO.,
820 Real Estate Trust Bldg., Philadelphia, Pa.

RELAYING RAILS FOR SALE.

150 tons 40 lb. Iron Relaying Tee Rails with splices.
50 tons 25 lb. Iron Tee Rails for mining purposes.

A COHEN & SONS,
1212 W. 8th St, Kansas City, Mo.

CORLISS ENGINES FOR SALE.

1 34 x 60 Right Hand Horizontal Engine with 24 ft. diameter, 30 ton fly wheel.
1 34 x 60 Left Hand Horizontal Engine with 25 ft. diameter, 40 ton fly wheel.

W. J. CARLIN COMPANY,
610 and 611 Lewis Bldg., Pittsburg, Pa.
NEW YORK OFFICE:
514-515 Park Row Bldg., New York, N. Y.

WANTED.

To interest capital to the extent of \$00 to 300 thousand dollars in the Wholesale Hardware Business, to co-operate with a well established and paying business. No agents. Best references given. Address in confidence,

"WHOLESALE HARDWARE"

care *The Iron Age*, New York.

Wanted.

Experienced practical man wants established concern to manufacture recently invented machines. Has also other valuable patents but needs capital to put the inventions on the market. Address

"PRACTICAL MANUFACTURER,"

Care *The Iron Age*, 70 Kilby St., Boston.

FOR SALE.

One second-hand Norwalk Air Compressor 14 in. x 14 in. and 9 1/4 x 16. In first-class condition with three cutters and all necessary accompaniments. Can be seen in operation at works.

EVENS & HOWARD FIRE BRICK CO.,
St. Louis, Mo.

Wire Nail Machines Wanted.

Set of Nail Machines for from 2 to 60d. Wire Nails. State make, whether new or how long in use. Address offers to

"NAIL MACHINES,"

Care *The Iron Age*, 1205 Chemical Bldg., St. Louis, Mo.

WANTED.

A quantity of Cast Iron Floor Plate. Send price and size to
ROCKAWAY IRON & STEEL CO.,
Rockaway, N. J.

FOR SALE.

One-half interest in up-to-date Hardware Store. Clean stock. Thrifty manufacturing city of 20,000. Address "HALF," care *The Iron Age*, New York.

FOR SALE.

GOOD BUSINESS PROPERTY and clean stock of Hardware and Housefurnishing Goods, Tinning and Plumbing for sale. Stock \$3000, real estate \$6500. Buildings rent per year for \$608. Doing a good business in live town. Electric lights and water system. Reasons for selling to dissolve partnership. Sell cheap if sold soon. Located in Saratoga Co., N. Y.

"BARGAIN," 1227.

care *The Iron Age*, New York.

Locations for Industries.

The Chicago, Milwaukee and St. Paul Railway Company has all its territory districted in relation to resources, adaptability and advantages for manufacturing, and seeks to secure manufacturing plants and industries where the command of raw material markets and surroundings will ensure their permanent success.

A number of new factories and industries have been induced to locate—largely through the instrumentality of this company—at points along its lines.

The trend of manufacturing is Westward. Confidential inquiries are treated as such. The information furnished a particular industry is reliable.

Address

LUIS JACKSON,

Industrial Commissioner, C. M. & St. P. Ry.
440 Old Colony Building, Chicago, Ill.

THE LATEST BOOKS.

Analyses of Pig Iron. Containing information for foundrymen relative to the effect produced on castings by various constituents of iron; an article on the grading of pig iron; and many analyses of brands of pig iron from the various sections of the U. S. and from foreign countries. By Seymour R. Church. 173 pages, 4to, leather. \$2.50

Elements of Glass and Glass Making. A treatise designed for the practical glass maker, comprising facts, figures, recipes and formulas for the manufacture of glass—plain and colored. With an appendix containing useful information pertaining to the subject. By Benjamin F. Riser. Chemically revised by S. A. Koch, Ph.D. Illustrated. 8vo, cloth. \$3.00

The Reclamation of Land from Tidal Waters. A hand book for engineers, landed proprietors and others interested in works of reclamation. By Alex. Beasley, M.C.E. Illustrated. 8vo, cloth. \$4.20

The Design and Construction of Oil Engines. With full directions for erecting, testing, installing, running and repairing. Including descriptions of American and English kerosene oil engines. By A. H. Goldingham, M.E. Illustrated. 19mo, cloth. \$2.00

The Naval Architect's and Shipbuilder's Pocket Book of Formulae, Rules and Tables; and Engineer's and Surveyor's Handy Book of Reference. By Clement Mackrow. Seventh edition. Illustrated. 16mo, limp leather. \$5.00

Machinery for Refrigeration. Being sundry observations with regard to the principal appliances employed in ice making and refrigeration, and upon the laws relating to the expansion and compression of gases; principally from an Australian standpoint. By Norman Selfe. Illustrated. 416 pages, cloth. \$3.50

Free Hand Perspective. For use in manual training schools and colleges. By Victor T. Wilson, Instructor in Drawing in Cornell University. 8vo, 268 pages, cloth. \$3.50

A Catechism on the Combustion of Coal and the Prevention of Smoke. A practical treatise for engineers, firemen and all others interested in fuel economy and the suppression of smoke from stationary steam boiler furnaces, and from locomotives. By William M. Barr, M.E. 85 engravings. Nearly 350 pages. \$1.50

Linear Perspective. A practical hand book for architects, civil and mechanical engineers, designers, builders, masons, machinists, carpenters and painters, etc. By Herman T. O. Kraus, C.E. Oblong, cloth, price. \$2.50

The Science of Color Mixing. A manual intended for the use of dyers, calico printers and color chemists. By D. Patterson. 8 1/4 x 5 1/4, 148 pages. \$3.00

Diamond Drilling for Gold and Other Minerals. A practical hand book on the use of modern diamond core drills in prospecting and exploring mineral-bearing properties, including particulars of cost of apparatus and working. By G. A. Denny. With illustrative diagrams. 9 1/4 x 5 1/4, 163 pages. \$5.00

Iron Corrosion; Anti-Foaling and Anti-Corrosive Paints. By L. E. Andes. Translated from the German by Charles Salter. With 62 illustrations. 8 1/4 x 5 1/4, 284 pages. \$4.00

The Oil-Chemist's Hand Book. By ERASTUS HOPKINS, A.M., B.Sc., Chemist in Charge of U. S. Laboratories, Boston, Mass. 8vo, cloth. \$3.00

Chemistry of the Metals. By HOMER KASTLE. 193 pages, cloth. \$1.25

Modern Electric Railway Motors. A discussion of current practice in electric railway motor construction, maintenance and repair. By G. T. HANCHETT. Illustrated. 200 pages, cloth. \$2.00

Progressive Carpentry. Embodying results of a study of all known methods of construction during a fifty years' experience of the author. With many valuable improvements set forth and explained. Together with a system of framing roofs. Sixth edition, enlarged. By D. H. MELOY, Architect. Illustrated. 80 pages, 6 1/4 x 7 1/4 inches, cloth. \$1.00

Johnson's Handy Reference Book of Law and Fact. Containing the National Bankruptcy Act of 1898; an epitome of the Rules of Bankruptcy promulgated by the Supreme Court of the U. S. in November, 1908; the commercial laws of the several States, tabulated, including important legal forms and other valuable information desired by the busy man. By WALTER JOHNSON. 206 pages, 8vo, cloth. \$1.50

The Progress of Invention in the Nineteenth Century. By EDWARD W. BRYN, A.M. 300 illustrations. Large octavo: 480 pages; price, \$3.00 by mail, postpaid, to any country in the world. Half red Morocco, gilt top. \$4.00

The Law of Operations Preliminary to Construction in Engineering and Architecture. Rights in real property, boundaries, easements and franchises for engineers, architects, contractors, builders, public officers, and attorneys at law. By JOHN CASSAN WAIT, M.C.E., LL.B. (M.C.E., Cornell; LL.B., Harvard), 8vo, 638 pages. Cloth, \$5.00; Sheep, \$5.50

Street Pavements and Paving Materials. A manual of city pavements, the methods and materials of their construction. For the use of students, engineers and city officials. By George W. Tillson, C.E., Pres. Brooklyn Engineers' Club, Mem. Am. Soc. C. E., and Prin. Asst. Engineer, Department of Highways, Brooklyn, N. Y. 8vo, 532 pages, 60 figures. Cloth. \$4.00

Blue Print Making. Embracing directions for constructing the printing frame, preparing the paper and making prints of various kinds, 28 pages, paper. 25c

Practical Points for Stationary, Locomotive and Marine Engineers, Firemen, Electricians, Motormen and Machinists. By J. S. FARNUM. Revised and enlarged edition. Illustrated. 192 pages, cloth. \$1.00

Electric Wiring. Designed to serve both as an instructor for practical wiremen who have occasion to lay out their own work, and as a convenience and general reference book for electrical engineers whose work includes the calculation of transmission circuits, etc. By CHAS. P. POOLE. Illustrated. 101 pages, 8, leather. \$1.00

Sewage, and the Bacterial Purification of Sewage. By SAMUEL KIDAL, D. Sc. 8vo, cloth. \$3.50

A Text Book of Mechanical Drawing and Elementary Machine Design. By JOHN S. BIRD, Instructor in Mechanical Drawing and Designing, Sibley College, Cornell University, and DAVID REID, Instructor in Mechanical Drawing and Designing, Sibley College, Cornell University. 389 pages, 8vo, cloth. \$5.00

Air, Water and Food from a Sanitary Standpoint. By ELLEN H. RICHARDS and ALPHEUS G. WOODMAN, Instructors in Sanitary Chemistry, Massachusetts Institute of Technology. 293 pages, 8vo, cloth. \$2.00

Practical Hot Water Heating, Steam and Gas Fitting, Acetylene Gas—How Generated—How Used, showing the latest and most approved devices and appliances used, the value of acetylene gas as an illuminant, discussed from various points of view; every class of generator described; gas burners and piping; also the best and quickest method of doing hot water heating, steam and gas fitting, up to the present date. By J. J. LAWLER and GEO. T. HANCHETT. With tables, figures and folding plates. Revised edition. Illustrated. 8vo, cloth. \$2.00

Stromberg's Steam Users' Guide and Instructor. Giving explanations in regard to engines, pumps, dynamos, and electricity. Fifteenth edition, revised and enlarged. Illustrated. 354 pages, leather. \$2.50

The Cyanide Process of Gold Extraction. A text book for the use of mining students, metallurgists, and cyanide operators. By JAMES PARK. With numerous illustrations, tables and folding plates. First English edition, revised and enlarged from the third edition, published in New Zealand. (Authorized text book of Australian School of Mines.) 8vo, cloth. \$2.00

Glue and Glue Testing. With figures and tables. By SAMUEL KIDAL, D.Sc. Illustrated. 8vo, cloth. \$1.00

CONTENTS: Constitution and properties—Raw materials and manufacture—Uses of glue—Gelatin—Glue testing—Commercial aspects.

English and American Lathes. With 300 figures, diagrams and half-tone cuts. By JOSEPH G. HORNER, A.M., M.E. Illustrated. Large 4to, cloth. \$7.00

The Metallurgy of Lead and Silver, Part II, Silver. Being one of a series of treatises on metallurgy, written by associates of the Royal School of Mines. By HENRY F. COLLINS. Edited by Sir W. C. ROBERTS-AUSTEN, K.C.B., F.R.S. Containing numerous tables, diagrams and illustrations. 8vo, cloth. \$4.50

Practical Course in the Fire Assaying for Gold, Silver and Lead of Ores, Bullion and Metallurgical Products. By ERNEST H. SIMONDS. 94 pages, oblong, cloth. \$2.50

French Polishing and Enameling. A practical work of instruction, including recipes for making polishes, varnishes, glaze-lacquers, revivers, etc. By RICHARD BITHEAD. 19mo, cloth. 60c

Magnetic Induction in Iron and Other Metals. With tables, diagrams, figures and half-tone cuts. By J. A. EWING. Third edition, revised. Illustrated. 8vo, cloth. \$1.00

Electric Bells: How to Make and Fit Them. With numerous engravings and diagrams. Edited by PAUL N. HASLUCK. Illustrated. 19mo, cloth. 40c

Formulas in Gearing. With practical suggestions. By BROWN & SHARPE Mfg. Co. Illustrated. Third edition. 8vo, cloth. \$1.50

Building Model Boats. With numerous engravings and diagrams. Edited by PAUL N. HASLUCK. Illustrated. 16mo, cloth. 40c

Designs for Artistic Glazing in Modern Style. For all kinds of stained glass windows to be executed in cathedral, opalescent and other kinds of stained glass. By A. LYONBURN. Four parts. 36 colored plates, paper. \$5.00

The Organization and Management of a business corporation with special reference to the laws of New York, New Jersey, Delaware, W. Virginia; contains complete forms for by-laws, comparison of corporations and co-partnerships, etc. By T. CONINGTON. 203 pages, cloth. \$1.50

Enamels and Enameling. Introduction to preparation and application of enamels for technical and artistic purposes. For enamel workers, workers in gold and silver, etc. By P. RANDAU. Translated from German. 16 illustrations. 168 pages, cloth. \$5.00

The Electric Automobile; its construction, care and operation. By C. E. WOODS. Illustrated. Plans. 177 pages, D. cloth. \$1.25

Pocket Companion. Containing useful information and tables appertaining to the use of steel as manufactured by the Carnegie Steel Co., for engineers, architects and builders. By F. H. KIRBY. 325 pages, flexible leather tuks. \$2.00

Any Book Published Sent, Post paid, on Receipt of Price, by

DAVID WILLIAMS CO., Publishers and Booksellers,

232-238 William Street, New York.

Help Wanted.

Undisplayed Advertisements for Help Wanted not exceeding fifty words, including address. One Dollar each insertion. Additional words two cents each.

Original letters of reference should not be inclosed with replies to advertisements appearing in these columns, as they are frequently mislaid and lost. A copy of the reference will serve the purpose.

PRACTICAL TEMPERER: a man who could take full charge of tempering room and one who has had experience in tempering springs preferred. Address, giving full particulars and amount of wages expected, "Temperer," care *The Iron Age*, New York.

SALESMEN for Globe flue scraper and callow oil filter; liberal commission; excellent side line. Charles Charvat, Peoria, Ill.

A man about 30 years of age, to sell steel in New York City and vicinity. Address "Steel Salesman," care *The Iron Age*, New York.

A thoroughly experienced **ANALYTICAL CHEMIST** wanted immediately, with some years' experience in blast furnace work, especially in the manufacture of soft foundry iron; address, giving qualifications and references and stating salary expected; applicants will require to be posted in the burdening of furnace and in the making of quick assays by modern methods. Address "Superior," care *The Iron Age*, New York.

Razor strop manufacturer whose line is favorably known and well introduced desires experienced **HARDWARE** or **CUTLERY SALESMAN** to call on Pacific Coast trade; a liberal commission will be paid to the right party. Address, with references, "Kent," care *The Iron Age*, The Cuyahoga, Cleveland, Ohio.

Razor strop manufacturer whose line is favorably known and well introduced desires experienced **HARDWARE** or **CUTLERY SALESMAN** to call on Southern jobbing trade; a liberal commission will be paid to the right party. Address, with references, "Vulcan," care *The Iron Age*, The Cuyahoga, Cleveland, Ohio.

WANTED, MACHINERY SALESMAN.—Salesman who calls on machinery dealers in the principal cities to sell punches, &c., as a side line, for responsible manufacturers; we are willing to pay a fair salary to the right party; please state territory covered and what other lines you sell. Address "M. S. M.," care *The Iron Age*, New York.

Ten **HARDWARE SALESMEN** on the road; first-class territory. Geo. W. Trout & Co., Chicago, Ill.

MECHANICAL ENGINEERS.—We are continually increasing our output of elevating, conveying, crushing and screening machinery, and wish to correspond with competent engineers, trained in this class of work, who are open for engagements. Address the Aultman Company, Canton, Ohio.

MASTER MECHANIC at a blast furnace in Eastern Pennsylvania; one competent to superintend small machine, carpenter and blacksmith shops, and to take charge of boilers, engines and machinery, such as is usual at blast furnaces. Address, with references, "Blast Furnace," care *The Iron Age*, New York.

A concern owning plate iron works, with capacity to turn out heavy tanks, boilers, stacks, &c., desires to engage New York representative on commission; to one in a position to control business liberal inducements will be offered. Address "P. I. W.," care *The Iron Age*, New York.

A **MANAGER** for general store in New Mexico; want a married man who has had business experience with an interest in the business if services are satisfactory; no capital required, but party must come highly recommended. Address Box 16, care *The Iron Age*, 1205 Fisher Building, Chicago, Ill.

ROLLER for 10 and 12 inch mills who understands rolling high grade steels in guide and hand rounds. Address Westmoreland Steel & Mfg. Company, Greensburg, Pa.

One first-class experienced **CHAIN MAKER**, with view of manufacturing logging chains, &c. Address "Chain Maker," care *The Iron Age*, New York.

FOREMAN for foundry making light castings, principally malleable iron; requisites: not to exceed 45 years of age, temperate, good executive ability, and competent bench and floor molder; also **FOREMAN** for core department making principally small cores; requisites: must not be over 40 years of age, temperate, good executive ability, competent core maker. Address, stating full particulars, "Foundry," Station B, Buffalo, N. Y.

A thorough and experienced mechanic to act as **FOREMAN** of our machine shop; a married man between the ages of 35 and 45 years preferred; must be fairly well educated and competent to estimate cost of doing a piece of work, either in the repair line or new work; to the proper man a good, permanent situation will be assured; our specialty is the building of sugar making machinery in general; we also do saw mill work and build saw mill specialties and do general repair work; none but those who can furnish good references and are well equipped with mechanical knowledge and experience need solicit the position. Apply immediately to Payne & Joubert, 423 Carondelet street, New Orleans, La., stating experience and salary that would be expected.

WANTED.—An experienced man to take entire charge of the export trade of a large manufacturing concern. Address "Export Trade," care *The Iron Age*, New York.

A good **MACHINE TOOL SALESMAN**; one having traveled preferred. Address with references, P. O. Box 2803, Boston, Mass.

A first-class man to take position with factory making plect and stamped tinware; must understand the business and be capable of handling help; state if understand galvanizing and retinning; give age, experience, references and salary wanted. Address "Superintendent," care *The Iron Age*, New York.

First-class **CUTLERY** and **SPECIALTY SALESMEN** to sell a high-grade popular priced and complete line of long blade cutlery specialties, including all sorts of butchers' cutlery, kitchen knives, bread knives, paper hangers' knives, &c.; only men traveling specific territory regularly and who can sell goods wanted; to such we will make liberal commission proposition. Address "Long Blade," care *The Iron Age*, New York.

Experienced **HARDWARE** or **CUTLERY SALESMEN** who thoroughly canvass one or two of the following States: Pennsylvania, Michigan, Indiana, Illinois, Kentucky, Missouri, Kansas, Colorado, Montana and coast, to take a side line of miscellaneous cutlery, butcher, putty and kitchen knives, &c. Address "Big Cut," care *The Iron Age*, New York.

Situations Wanted

Undisplayed Advertisements for Situations Wanted not exceeding twenty-five words, including address. Fifty cents each insertion. Additional words two cents each.

Man of 32, at present treasurer of a steel company and who has held other responsible office positions, wishes to make change; can give good reasons for wishing to do so; best of references; position in vicinity of Chicago preferred. Address Box 18, care *The Iron Age*, Fisher Building, Chicago, Ill.

A **CHEMIST** with nine years' experience desires position in iron and steel work. Address Box No. 19, care *The Iron Age*, 1205 Fisher Building, Chicago.

A **ROLLER** with 30 years' experience in continuous or other mills; can give best of references. Address "E. C. K.," care *The Iron Age*, New York.

A **TRAVELING SALESMAN** of 15 years' successful experience, as direct representative for hardware manufacturer to the large jobbers of shelf and heavy hardware throughout the United States and Canada, will be open for a similar or modified engagement after January 1; answer desired from manufacturers only who want exclusive services of an able representative at remunerative salary; as to honesty, ability and sobriety can refer to largest houses in the trade, also present employers. Address "Executive Ability," care *The Iron Age*, New York.

At liberty, practical, experienced **SUPERINTENDENT** or **MANAGER**; 15 years with best concerns; sober, reliable, well recommended, systematic, well up in modern shop practice, cost systems and buying; best of references. Address "Liberty," care *The Iron Age*, New York.

Experienced **HARDWARE SALESMAN** desires line by January 1 for Vermont, New Hampshire and Massachusetts; established trade. Address "M.," P. O. Box 179, Sawgut, Mass.

A practical machinist with more than 10 years' experience in different machine tool shops wants to start in a drawing room. "K. S.," care *The Iron Age*, 117-119 South Fourth street, Philadelphia, Pa.

As **MANAGER** or **SUPERINTENDENT** of blast furnace by graduate mining engineer; ten years' practical experience in management of blast furnaces using anthracite and coke for fuel and magnetic, lake and low grade ores; successfully made basic foundry, mill and Bessemer irons for the open market. Address "Blast Furnace," care *The Iron Age*, New York.

FOUNDRY FOREMAN of the Lane & Bodley Company desires position; accustomed to engine, air compressor, dry and green sand molding. Chas. Klein, 1614 Scott street, Covington, Ky.

As **SUPERINTENDENT** of universal sheared or bar mills, iron or steel; 20 years' experience. "Superintendent," care *The Iron Age*, 117-119 South Fourth street, Philadelphia, Pa.

A gentleman traveling periodically over the Southern States, calling on manufacturers and dealers, is desirous of representing two or three more houses on a commission basis. Address "Ralph," care *The Iron Age*, New York.

SALESMAN, PURCHASING AGENT or **EASTERN REPRESENTATIVE** for a representative house in machinery and supplies, having 12 years' experience and thoroughly conversant in all details; all references furnished. "M. E. R.," care *The Iron Age*, New York.

A gentleman of 32, with a large and creditable business career in hardware manufacturing and jobbing, seeks a new connection as **MANAGER** or **SALESMAN** with a wholesale house where energy will tell. Address "New Connection," care *The Iron Age*, New York.

Position as **FACTORY MANAGER**; a practical mechanic and thoroughly familiar with most efficient modern methods of management in foundries, machine shops and allied departments; extensive experience as an expert in the management of help and general manufacturing. "Factory Manager," care *The Iron Age*, New York.

ACCOUNTANT, thoroughly experienced in blast furnace, rolling mill, coal mining and coke oven accounting, will be open for engagement about February 1; highest references from present employers. Address "Coke," care *The Iron Age*, New York.

ROLL TURNER (age 32) desires a situation in a first-class mill; an active, sober and reliable man. Address "Active," care *The Iron Age*, Hamilton Building, Pittsburgh, Pa.

An energetic, capable man, with several years' experience as traveling salesman and office manager, desires position; personally acquainted with wholesale and retail hardware trade through the West; highest references. Address "Newton," care *The Iron Age*, The Cuyahoga, Cleveland, Ohio.

By first-class **ROLL TURNER**; large experience on all kinds of work. Address "R. T. R.," care *The Iron Age*, New York.

Change of location desired by man capable of taking entire charge of the construction and management of a modern open hearth steel and rolling mill plant. Address "E. M.," care *The Iron Age*, New York.

MACHINERY SALESMAN desires change; well balanced combination of engineering skill and commercial tact; steam plants, power transmission, elevating and conveying machinery. Address "Versatile," care *The Iron Age*, New York.

WANTED.—Active position by man with experience in machine shop, drafting room and other branches manufacturing; references. Box 1429, Boston, Mass.

As **RAILWAY SUPPLY SALESMAN** by business man with years of experience; is well known among railway officials and mill men in West, South and Mexico as an expert mechanic; capable of making estimates and contracts. Address "Railway Supplies," care *The Iron Age*, Chemical Building, St. Louis, Mo.

MECHANICAL and **ELECTRICAL ENGINEER**, thoroughly competent to take the management or superintendency of a manufacturing or power plant, wishes a position. Address Box 17, care *The Iron Age*, 1205 Fisher Building, Chicago, Ill.

An experienced bookkeeper, several years with large iron works, desires position in Philadelphia or vicinity; best references as to character and ability. "Bookkeeper," care *The Iron Age*, 117-119 South Fourth street, Philadelphia, Pa.

As **FOUNDRY MANAGER** or **SUPERINTENDENT**; over 20 years' practical experience in all branches; thoroughly understand cupola practice, mixing and melting metals, management of men, making estimates, contracts, &c.; can look after commercial as well as mechanical part of business or solicit trade on road. Address "Foundry Manager," care *The Iron Age*, Chemical Building, St. Louis, Mo.

Expert accountant; 20 years' practical experience in manufacturing and wholesale business; thoroughly familiar with most approved methods for handling department accounts and factory costs; all references; position in New England preferred. Address "R. P. R.," care Braman, Dow & Co., 239 Causeway street, Boston, Mass.

A man with 16 years' experience in the general iron and steel commission business as principal, desires to make a change; capital if required; preference, connection with some large steel company. "Iron and Steel," care *The Iron Age*, 117-119 South Fourth street, Philadelphia, Pa.

TWO IMPORTANT NEW BOOKS.

Furnace Heating. Galvanizing and Tinning.

A Practical and Comprehensive Treatise on Warming Buildings with Hot Air, by William G. Snow, with an Appendix on Furnace Fittings. 170 pages; size, 6 x 9 inches. Cloth bound. Price, \$1.50.

This is the only book that has been brought out which presents a systematic and reliable treatment of the warm air furnace system of heating.

It deals with the various types of furnaces, their construction, proper location and setting, together with furnace fittings, and all matters pertaining to the installation of furnaces and to effective and economical heating by warm air. The subject is discussed for the first time by a competent author possessed of a scientific education and a practical training, who presents positive rules, based on a long experience, for guidance in designing furnace systems for dwellings and other buildings where this popular method is employed. The various details of furnace work are described simply and at such length that the volume will be valuable to all who are in any way interested in the subject. It is recommended to practical furnacemen, to architects, builders and house owners, and to tanners and plumbers in suburban sections who do furnace work. To all these it will prove a reliable text-book and guide.

PARTIAL SUMMARY OF CONTENTS BY CHAPTERS.

Chapter I.—Furnaces—Is devoted to Furnace Construction—The Relative Proportion of Furnace Parts—Secondary Heating Surface—Economy and Efficiency—Heating Capacity and Exposed Wall Surface—Manufacturers' Ratings of Their Own Productions, etc.

Chapter II.—House Heating—Compares Furnaces and other apparatus, and describes Method of Setting Brick and Portable Furnaces—Location and Area of Cold Air Supply—Cold Air Rooms and Air Filters—Return Ducts and Air Circulation—Size of Hot Air Pipes—Location of Registers, etc.

Chapter III.—The Combination System—Discusses Heating Distant Rooms with Radiators—Balancing the System—Location of Water Heater in Furnace—Capacity of Water Heaters—Size of Radiators, etc.

Chapter IV.—Air—Deals with the Necessity of Ventilation—Water Needed to Moisten Air—Expansion of Air—Velocity of Air in Tubes, etc.

Chapter V.—Heating and Ventilation of Buildings—Considers the Size of Furnaces Required—Fresh Air Room and Supply—Air Circulation—Size of Flues—Use of Stack Heaters—Size of Heating Coils in Vent Flues, etc.

Chapter VI.—Heating of Public Buildings, Churches and Stores—Is given to the Size of Furnaces Required—Grate Surface in Ventilated Buildings—Air Supply—Size of Heating and Ventilating Flues—Size of Stack Heater, etc.

Chapter VII.—Fan-Furnace Combination System—Is devoted to Positive Warm Currents from Fan Systems—Location of Fan and Driving Apparatus—How Good Furnaces are Aided by Fans—Types and Efficiency of Fans—Area of Ducts and Flues, etc.

Chapter VIII.—Temperature Control.

Chapter IX.—Estimate and Contract Blanks.

Chapter X.—Value of Fuels. The Proper Size for Furnace Chimneys—with tables.

APPENDIX.

Furnace Fittings.—A section of 45 pages dealing with the Making of Furnace Casings—Metal Cold Air Boxes—Making Furnace Bonnets and Collars—Making Pipe and Elbows—Register Boxes and Stack Shoes, etc.

A Practical Treatise on Coating with Tin and Zinc, with a Special Chapter on Tinning Gray Iron Castings, by W. T. Flanders. Size, 5½ x 8 inches. 93 pages, 40 illustrations. Cloth bound. Price, \$2.00.

The author of this work has made a specialty of galvanizing and tinning, and has been employed to erect plants in various parts of the country, also to instruct the owners, so that, in all instances, they have been able to operate them successfully. The subject of galvanizing is, therefore, treated from the standpoint of an expert and in a practical manner. The selection of materials and apparatus for erecting plants of large and small capacity is treated, together with instructions for their equipment and accompanied by many illustrations of the plants and of the tools and appliances. Plain directions are given for the preparatory treatment of metals and articles to be coated, and every detail which is of importance in successfully applying to metals a secure and attractive coating is described. The tinning of articles is treated in the same practical manner. The difficulties found by many who have attempted to tin malleable and gray iron castings are explained and methods for doing the work made simple.

CONTENTS.

Galvanizing.

Locating a Plant and Selecting a Kettle.
The Galvanizing Room.
Tanks for Acids and Other Purposes.
Tools for Galvanizing.
Filling and Firing a New Kettle.
The Use of a Pyrometer.
Materials Used in Galvanizing.
Building and Setting Kettles.
Removing Scale with Sulphuric Acid.
Cleaning Sandy Castings with Sulphuric Acid.
Preparing the Work for Dipping in the Zincing Bath.
Drying the Work.
The Heat of Zinc.
Dipping the Work in the Molten Metal.
The Formation of Dross in the Kettle.
Running Over, or "Sweating," Zinc Dross.

Tinning Malleable Iron, Wrought Iron and Steel.

Preparing the Work.
Tools and Kettles.
A Tinning Plant.
Plan of Tinning Plant.
Removing Scale and Rust with Sulphuric Acid.
Cleaning Sandy Castings with Sulphuric Acid.
Cleaning Sandy Castings with Hydrofluoric Acid.
Removing Paint or Grease.
Tinning with a Single Kettle of Tin.
Tinning with Two or More Kettles of Tin.
Passing the Work Through the Tinning Kettles.
Tinning Wire in Coils.
Tinning Steel Spoons and Similar Articles.
Retinning.
Setting Retinning Kettles.

TINNING COMMON GRAY IRON.

Description of Tinning Plant.
General Considerations.
Tumbling Barrel.
Freeing Gray Iron Castings from Sand by Hydrofluoric Acid.
Cleaning Sandy Castings with Sulphuric Acid.
The Use of a Hot Alkali Bath in Certain Cases.
Preparing the Castings in the Gas Barrel.
Coating the Castings with Tin.

SENT POSTPAID ON RECEIPT OF PRICE BY

DAVID WILLIAMS COMPANY, Publishers, 232-238 William Street, N. Y.

STRAIGHT MFG. CO.,**JAMESTOWN, N. Y.**

FINE TOOL, SCREW MACHINE AND DRILL PRESS WORK. BROACHING, TEMPERING, ANNEALING AND ENAMELING. CORRESPONDENCE INVITED.

CONTRACTORS

For the Manufacture of

Hardware Specialties and Metal Goods.**\$1,000
or
\$1,000,000**

It makes no difference how large or small a property is, we guarantee an exact appraisal.

What is your plant worth in detail at present market prices?

How much would it cost to replace it completely?

Can you tell accurately how much insurance you can legally carry on it?

Can you tell how much insurance you could collect in case of a complete loss?

These questions are vitally important to all owners, stockholders or investors. The American Appraisal Co. can answer them.

We furnish complete and accurate invoices, inventories, and plans of manufacturing plants, mills and all properties, guaranteeing absolute proof of loss in case of fire and correct data for carrying insurance. Invaluable in securing loans. We can refer you to the following and many others: Bridgeport Brass Co., Bridgeport Conn.; Fairbanks, Morse & Co., Chicago, Ill.; Vaughn Machine Co., Peabody, Mass.; Ansonia Clock Co., Brooklyn, N. Y., and many others. We will call upon you or write you. Send for our book of particulars.

THE AMERICAN APPRAISAL CO.

OF MILWAUKEE,

Capital Stock \$100,000.

Eastern Department,

804-805 Park Row Bldg., New York.

Telephone.

CASTINGSGrey Iron and Brass, all sizes,
either finished or in
the rough.We make both Wood and
Metal Patterns from
Blue Prints or
Drawings.**West Side Foundry Co.,**
TROY, N. Y.New York Office, - 50 Cliff St.
Telephone 834.**WILLIAMS PRINTING CO.,**

Commercial Printers and Binders.

CATALOGUES A SPECIALTY.

232-238 William Street, New York.

PRESSED METAL WORK.Light and Heavy Plates
Cut to Shape.Sole Mfrs. of "NEVER-BREAK" Goods.
THE AVERY STAMPING CO.,
Cleveland, Ohio.**PATTERNS****THE BALKWILL PATTERN WORKS,**

970-972 Hamilton St., CLEVELAND, O.

WE MAKE A SPECIALTY OF RUSH WORK.**Book Notes****Iron Corrosion, Anti-Fouling and Anti-Corrosive Paints** are considered in the German work of Louis Edgar Andes, now translated into English by Chas. Salter. The book contains the results of research by the author, with the question of the oxidation of structural iron exhibited under the influence of air, moisture and fluctuations of temperature, which, with the corrosion of screws and rivets, endanger the strength, safety and durability of structures. The work also deals at length with the properties of paints, pigments and oils, and their application and testing, the detection of adulterants, &c., gives results of the examination of several corrosive paints, and various means of preventing rust, &c. The illustrations, 62 in number, consist largely of photographs of rust formations. 275 pages, cloth.....\$4.00**Manufacturing and Testing of Glue.**

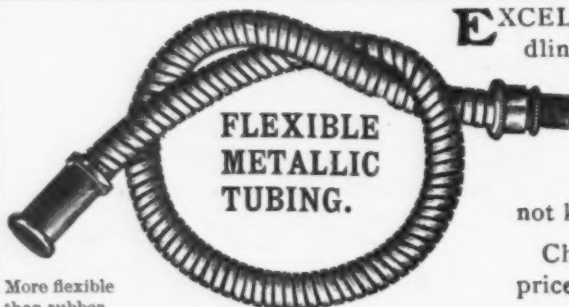
—A volume entitled "Glue and Glue Testing," by Samuel Rideal, D.Sc., London, recently published, treats of the manufacture, properties and use of glue and gelatine, with a chapter discussing their commercial value. 144 pages, cloth.....\$4.00

Eissler's Metallurgy of Gold, a standard English work on the extraction of gold from the ore, just appears in revised and extended form (fifth edition). The new matter includes later developments in the cyanide and chlorination processes. The volume contains 656 pages, and upward of 300 illustrations, in addition to a number of folding plates. The price is advanced to...
\$7.50**American Telephone Practice**, by Kempster B. Miller, M.E., is now published in the third revised and enlarged edition. This is claimed to be the most complete treatise in English on telephony. The author wrote from experience, acquired as examiner in the United States Patent Office in the tele-

phone class, and subsequently as a telephone engineer of wide practice. The text is illustrated by cuts of commercial apparatus and diagrams of circuits accompanied with explanations. The apparatus, circuits and methods of the American Bell Telephone Company and of the various independent companies are described, and the apparatus and methods used in making the tests required in commercial telephone work are treated. 510 pages, 380 illustrations, cloth.....\$3.00

Ropp's Commercial Calculator is a useful little manual to merchants, mechanics and others in making quick and accurate computations. Short methods in arithmetic, computing percentage, interest and trade discount, extraction of roots, rules in practical mensuration are features. Various tables of general usefulness are included, notably tables of interest, wages, lumber, live stock, grain, a table showing the value of articles sold by the pound, piece, yard, or dozen at prices from 1/2 cent to \$1, and other tables for rapid reckoning. The book is made in pocket form, and has 128 pages of closely printed matter. Cloth, 50 cents; leather.....\$1.00**The Successful Man of Business**, by Benjamin Wood, contains sensible talks on principles and conduct essential to ultimate or continued success in business. The book refers to the careers of many well-known self made men, portraying the characteristics, qualifications and methods through which, coupled with persistent mental and physical labor, they acquired prosperity. Philosophical extracts and quotations from the works of renowned writers are interspersed. The author wrote from observation and experience while associated with the firm of S. N. Wood & Co., New York and San Francisco. The subject matter is indicated to some extent by the following headings: The Lesson of Grant, Luck Never Creates Wealth, Circumstances are the Creatures of Men, Solid Facts, Business Foundation, Child Study, Advertising, Hope, Play Your Part Unaided, The Fireside, Intemperance, Employees, Self Made Men. 208 pages, 5 x 7 1/2 inches, cloth bound.....\$1.00

All Books prepaid at published prices.

DAVID WILLIAMS CO., Publishers and Booksellers, 232-238 William Street, New York.**FLEXIBLE
METALLIC
TUBING.**More flexible
than rubber
and lasts ten
times as long.**EXCELS** rubber hose for handling steam, compressed air, water, gas, oil, spirits, and all other uses.

Made from copper and steel tape. Will not kink or crush.

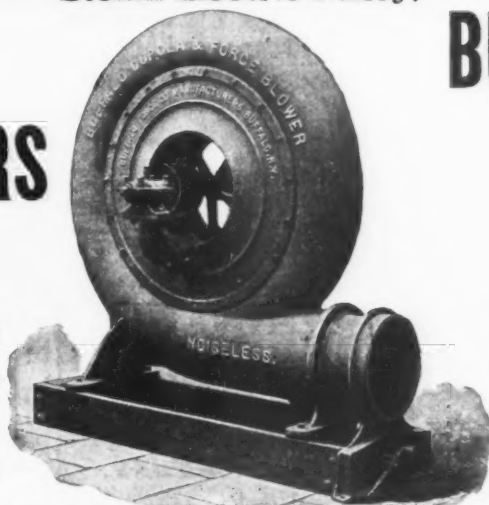
Cheap, durable, safe. For prices, etc., address

SHARP, KLUMPH & Sisson CO.,1104-1105 Monadnock Bldg.,
CHICAGO.

Steam-Electric-Pulley.

BUFFALO BLOWERS

Steel Pressure Blowers
for Cupolas, Forge Shops
and all high pressure
blast-service. ❀ ❀ ❀



Buffalo Steel Pressure Blower, Adjustable on Bed.

BUFFALO FORGE COMPANY,

Buffalo, N. Y.

BUFFALO BLOWERS

"B" Volume Blowers
for Forced Draft, Heating
Furnaces and Buffalo
Down Draft Forges. ❀ ❀

METAL STAMPING.

Dies, Punches
Metal Stamping.
Send sample or
sketch for prices.

E. KONIGSLOW & BRO.,
184 CHAMPLAIN ST.,
CLEVELAND, O.

We do

Special Stamping,

Light or heavy, rough or finished.
Send samples or drawings for estimate.

WHEELING HINGE CO., Wheeling, W. Va.

SPINNING BRASS, STEEL, ALUMINUM or any Old Metal.

Sheet metal articles of any kind. Press work. Inventors'
sheet metal models. Difficult work our specialty. Write us.

Address, SHEET METAL DEPARTMENT,

THE GOODWIN & KINTZ CO., Winsted, Conn.

SHEET STAMPINGS. METAL DIES, PUNCHES, SPECIAL MACHINERY and TOOLS.

New and strictly up-to-date equipment, prompt delivery and low prices.
Send sample or drawing for estimate.

FRANK MOSSBERG CO., Attleboro, Mass.

Mfrs. Sheet Metal Novelties and Special Tools and Mach'y.

DIES, PUNCHES, SPECIAL MACHINERY and TOOLS. SHEET STAMPINGS. METAL

Don't think because we are in the West we can't do it, but send sample or sketch for prices.
AMERICAN HARDWARE MFG. CO., OTTAWA, ILLS.

SHEET METAL STAMPINGS

Of Every Description. Send for Estimate.

Houghton & Buxton Mfg. Co., Worcester, Mass., U. S. A.

AMERICAN RAILWAY SUPPLY COMPANY.
Manufacturers of
BAGGAGE, HOTEL AND FACTORY TIME
CHECKS, METAL FIGURES AND LETTERS
AND EVERYTHING IN THE LINE OF
STAMPED METAL WORK.
24 PARK PLACE, NEW YORK.



Difficult Parts
Like This....

MADE BY

H. H. Franklin Mfg. Co.,
Syracuse, N. Y.

STAMPING —AND— SHEET METAL WORK.

CLEVELAND STAMPING & TOOL CO.,
CLEVELAND, OHIO.

A. G. BUTLER, PATTERN LETTERS

For Iron and Brass Cast-
ings. Various styles and
sizes. For Machines,
Bridges, Tablets, etc.
Leather and Wood Fillets.

Beekman Bldg., 103 Beekman St., New York.

MARKLE DYNAMO METAL.



FINEST QUALITY
Designed for High Speed
Machinery and also for
Heavy Bearings where the
BEST quality is wanted.
Per lb. \$.40

MARKLE MERIT METAL.



HIGH GRADE.
Suitable for Heavy or
Light Machinery. For gen-
eral use the best Babbitt
Metal on the market. We
guarantee this metal to give
satisfaction wherever used.
Per lb. \$.35

MARKLE'S EUREKA BABBITT.



A First-class Anti-Friction
Metal for general use. Will
compare favorably with
the best anti-friction metals
on the market.
Per lb. \$.18

A complete line of medium and cheap Babbitt
Metal and all grades of SOLDER.
Special Metals Matched, and All Kinds of Al-
loys Made to order.

Full satisfaction guaranteed or money re-
funded.

MARKLE LEAD WORKS, St. Louis, U. S. A.
Makers of Shot, Babbitt Metal, Solder, Bar Lead,
Can Wax, Targets and Traps. AGENTS WANTED.

ELECTROTYPES OR STEREOTYPES

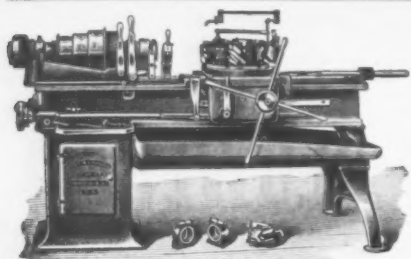
WHEN YOU WANT GOOD ONES, ORDER FROM
BRIGHT'S "OLD RELIABLE"
ST. LOUIS ELECTROTYPE FOUNDRY.
211 N. THIRD ST. ST. LOUIS, MO.

BUY THE BEST.
"ECLIPSE" and "ST. LOUIS"
Shoe Stands and Lasts, Shoe
Hammers, Foot Rests,
Saw Clamps.



Write for Net Prices.

JOHN C. KUPFERLE, St. Louis.



The Flat Turret Lathe

Does lathe work accurately
up to 2 in. diameter
by 24 in. long.

JONES & LAMSON MACHINE CO.

MAIN OFFICE AND WORKS:

SPRINGFIELD, VERMONT, U. S. A.

A. B. C. and Lieber's Codes used.

ENGLISH OFFICE:

Room 6, Exchange Building, Stephenson's Place,
Birmingham.

FRANCE AND SPAIN:

PH. BONVILLAIN,
8, Rue Blanche, 6, Paris, France.

GERMANY, BELGIUM, HOLLAND, SWITZERLAND AND
AUSTRIA-HUNGARY:

M. KOYEMANN,
Charlottenstrasse 113, Düsseldorf, Germany.

THE W. S. TYLER COMPANY,

MANUFACTURERS OF

Improved Revolving Mining Screens,

FOR COAL, ORES, PHOSPHATES, ETC.

Also Tipple Screens and Yard Screens. Extra
Heavy Double Crimped Mining Cloths,
of every Description.

W. S. TYLER, PROCTOR PATTERSON,
Pres. Sec. and Treas.
CLEVELAND, OHIO.

The only reasons that higher prices are being constantly paid by the most prominent steam users in the United States for Cahall Boilers are—that they are better made, last longer, cost less for maintenance, show a higher efficiency and make drier steam than any other kind.

Send for illustrated catalogue.

Cahall Sales Department, Pittsburg, Pa

"AMERICAN" TRANSMISSION ROPE.

SEE ADVERTISEMENT
PAGE 6.

ALUMINUM
Ingots, Sheets, Wire, Rods, Castings.
Aluminum Wire and Cables (bare and insulated)
FOR
ELECTRICAL CONDUCTORS.
The Pittsburgh Reduction Co.,
Pittsburgh, Pa.

H. C. FRICK COKE CO.

Post Office, PITTSBURG, PA.

Mines and Ovens in the Connellsville Coke Region, Penna.

HEADQUARTERS FOR

GENUINE CONNELLVILLE COKE

For Blast Furnaces and Foundry
Cupola Work; also Crushed Con-
nellsville Coke (substitute for An-
thracite Coal) for manufacturing
and domestic purposes.

13,500 Ovens.

Daily capacity, 30,000 tons of Coke.

Direct Connections with all Railroads Entering the Region. Quotations, Freight Rates, Pamphlets giving full information, promptly furnished upon application.

FRICK COKE

DO you want a lathe for your tool-room or laboratory; one that is adapted to and will produce the finest class of work in great variety? If so, this 12-in. Hendey-Norton will exactly meet your requirements in every particular. **It has ALL the valuable attachments and improvements for which the Hendey-Norton lathe is noted.**

Also regularly furnished with drawing-in collet and watch tool chucks from $\frac{1}{8}$ to $\frac{1}{2}$ by 16ths; special

sizes up to $\frac{1}{2}$ in. can be furnished if wanted. These are invaluable for making small taps, reamers, mills, and other small tools from the rod—no previous cutting off and centering required.

This lathe furnished in 4 ft., 5 ft. and 6 ft. beds.

For catalogue and full description send to

THE HENDEY MACHINE CO.,

Torrington, Conn., U. S. A.

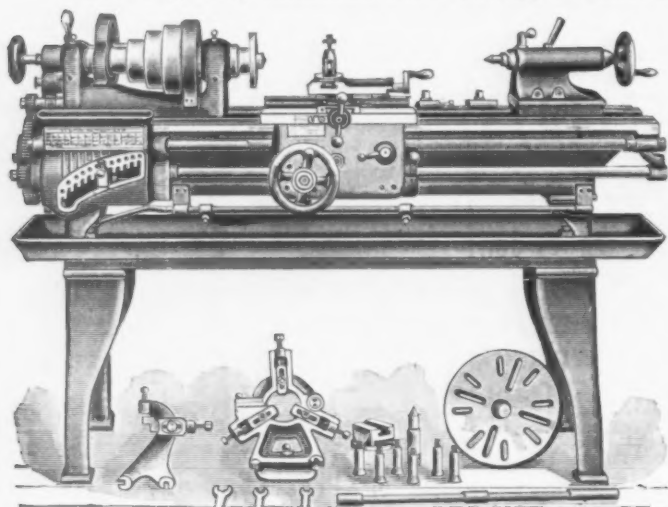
OR THE FOLLOWING

U. S. AGENTS:

Hill, Clarke & Co., Boston; Manning, Maxwell & Moore and The Garvin Machine Co., New York; J. W. Cregar, Philadelphia; U. Baird Machinery Co., Pittsburg; The E. A. Kinsey Co., Cincinnati; Manning, Maxwell & Moore, Chicago; Pacific Tool & Supply Co., San Francisco.

EUROPEAN AGENTS:

Schuchardt & Schutte, Berlin, Vienna, Brussels, Stockholm, St. Petersburg, Chas. Churchill & Co., Ltd., London, Birmingham, Adphe. Janssens, Paris. Stussi & Swaifel, Milan, Italy.



12 in. x 5 ft. Hendey-Norton.

THE IRON AGE

THURSDAY, DECEMBER 27, 1900

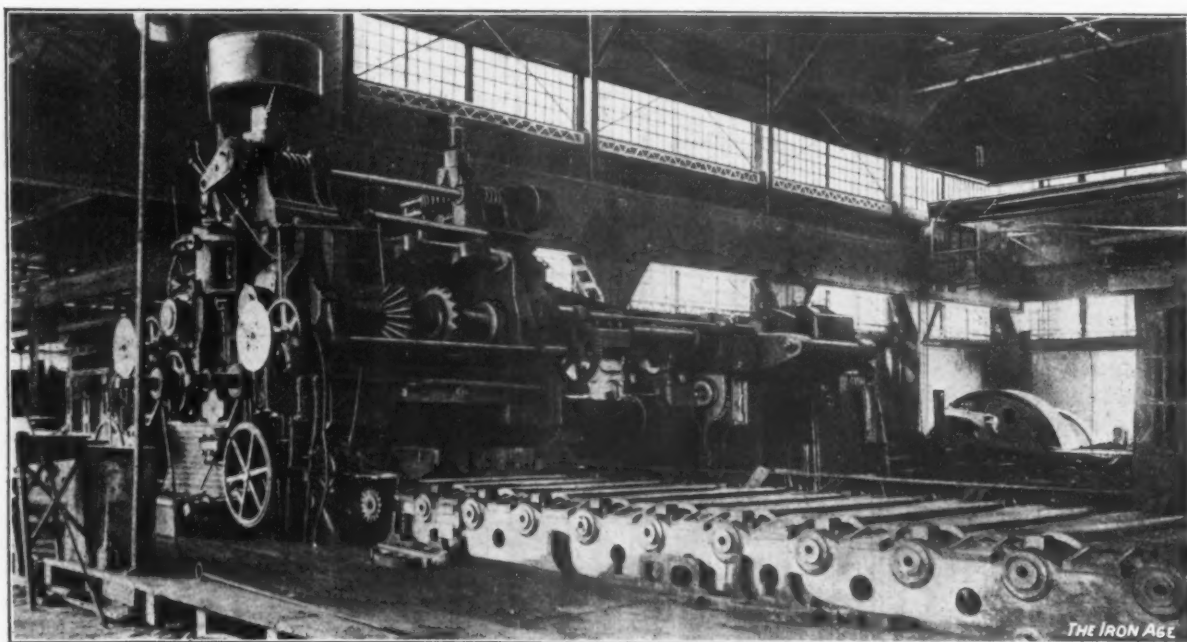
The Homestead 48-inch Universal Plate Mill.

Among the recent additions made to the Homestead Works of the Carnegie Steel Company is the installment of a 48-inch universal plate mill. In this mill the plates are rolled direct from slab ingots, and range from 20 to 48 inches in width, 5-16 inch to 2 inches in thickness, and up to 150 feet in length. The largest output for any one day of 24 hours up to this time is 576 gross tons, and for one month 10,200 gross tons. The mill averages about 9500 gross tons per month.

Work on construction was commenced in September, 1898, and the mill was put in operation July 18, 1899. The nature of the ground was such as to require exten-

sive foundation work, being situated near the river, and in a deep hollow. Especially was this the case under the hot beds and shear tables, where, instead of building up with concrete or solid brick work, a series of arches reaching from one side to the other were built, and the foundation for the machinery constructed on these.

The mill proper and the 50 x 60 inch direct connected reversing engines driving same were built by Mackintosh, Hemphill & Co. The horizontal rolls are



THE 48-INCH UNIVERSAL PLATE MILL, HOMESTEAD WORKS, CARNEGIE STEEL COMPANY.

Referring to the general plan, it will be seen that the plant is covered by four buildings, one for the heating furnaces, one for the mill proper, one for the hot beds, shear and shipping floors, and one for the boilers. The six heating furnaces are arranged in two rows of three each, with the fronts facing the center, the space between being occupied by the charging and drawing machines. The furnaces are of the Siemens regenerative type, with four doors, each 6 feet wide. The inside dimensions are 8 feet 3 inches wide and 36 feet 3 inches between the bridge walls. Each furnace is provided with two Forter reversing valves and a stack 4 feet 6 inches in diameter and 105 feet in height. The doors are raised by small hydraulic cylinders, and are all operated by one boy from a central pulpit. While the furnaces are now using natural gas, they are so designed that producer gas may be used. The furnaces are equipped with two electric charging and drawing machines, built by the Wellman-Seaver Engineering Company. Shown in

30 inches in diameter, and the vertical rolls 17½ inches. The mill and engines are covered by a 50-ton Morgan Engineering Company crane of 70 feet span.

Located in the table between the mill and hot beds is a Hilles & Jones plate straightening machine, supported on slides, and so arranged that it can be moved to one side by means of a hydraulic cylinder when not in use, the gap in the table being then filled by a plate attached to the machine. This machine is only used for taking out buckles in light plates.

There are two separate and complete hot beds with one table running through the center, delivering the plates to either bed alternately. The hot beds consist of endless chains supported by guides and crossing the center table, straightening plates and shear tables. These chains convey the plates from the table to the straightening plates, where they are straightened edgewise, and then to the shear tables. The center table, and chains and straightening plates for both hot beds, are operated by one man from a pulpit at the end of the center table.

On the shearing floor are three steam guillotine shears built by the Morgan Engineering Company. After being sheared the plates are run out on casters to a 40,000-pound Fairbanks scale, 60 feet long, and weighed. They are now ready for shipment. The shear and shipping

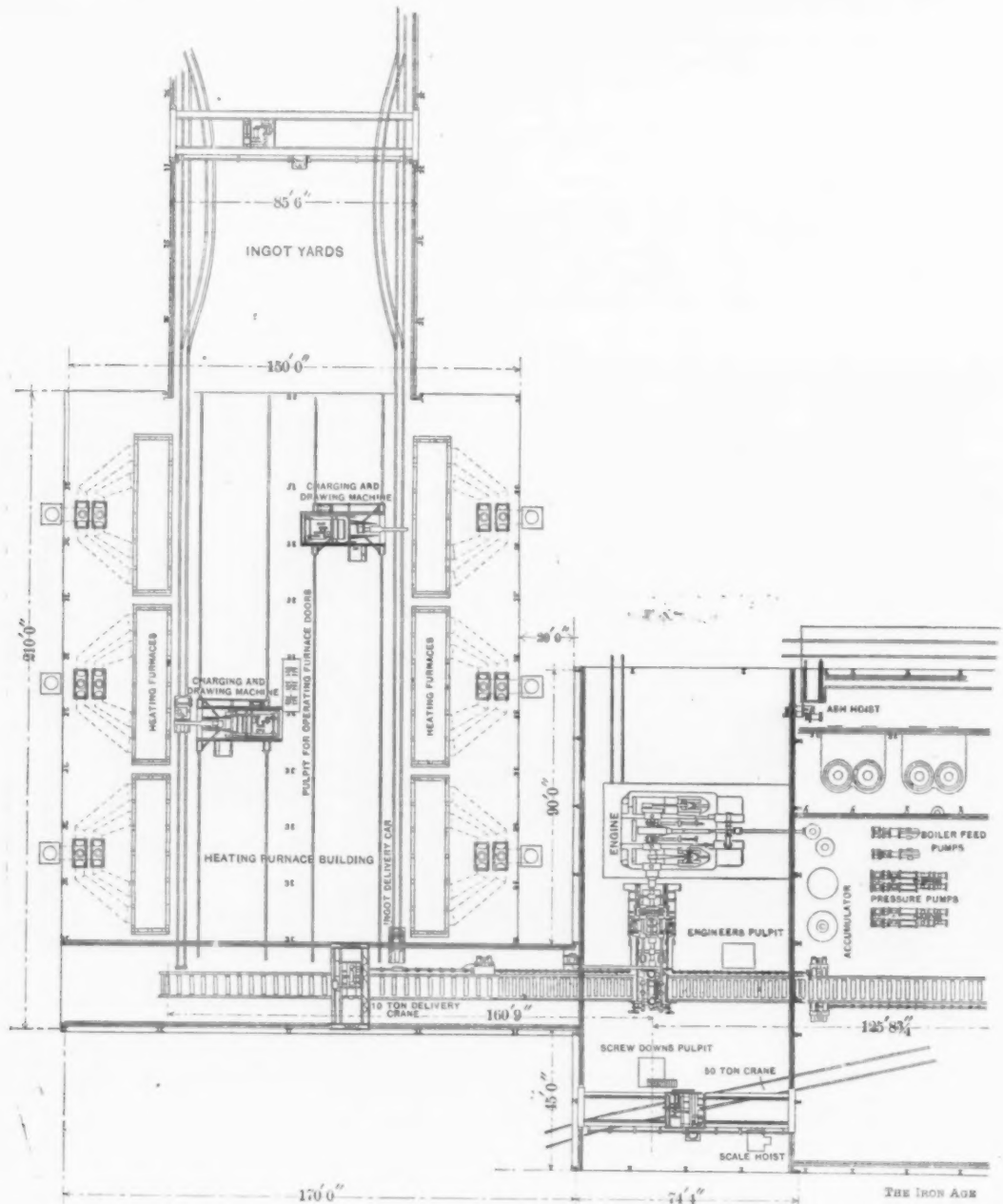
floors and hot beds are covered by three 20-ton cranes of 115 feet 4 inches span, two of which were built by the Wellman-Seaver Engineering Company and one by the Morgan Engineering Company.

The boiler plant consists of 16 250 horse-power Cahall vertical water tube boilers, equipped with the Mansfield chain grate stoker. Along the outside, and extending the entire length of the boiler house, are the coal bins, the top being on the yard level and covered with a standard gauge track, from which the coal, in drop bottom cars, is unloaded. The coal is elevated from the bins and de-

The Duty on Scrap Steel.

In the case of A. Milne & Co. against the Collector of Customs of New York, the Board of General Appraisers has rendered the following decision, the opinion being by the General Appraiser, Fischer:

The merchandise in question consists of steel plate shearings, returned by the local appraiser as "steel boiler plate shearings as steel in all forms and shapes not specially provided for," and duty was assessed thereon at the rate of 4-10 cent per pound under the pro-



GENERAL PLAN OF THE 48-INCH

livered to the stoker hoppers by an electric traveling coal elevator built by Heyl & Patterson. Below the main floor of the boiler house is a second floor for taking care of the ashes. Under the boiler furnaces are ash chutes, which are closed by sliding doors. When one is full an ash car is run in front and the chute door opened, allowing the ashes to slide into the car. It is then run to the end of the boiler house, where it is emptied into a skip hoist which elevates and dumps the ashes into a standard guage car on the outside of the building. Two 12 and 17 x 10 and 15 inch Worthington duplex compound feed pumps complete the boiler plant. The hydraulic plant consists of two Wilson Snyder duplex compound pressure pumps, 22 and 36 $\frac{3}{4}$ x 10 x 36 inches with a 24-inch by 12-foot accumulator.

visions of paragraph 135 of the act of July 24, 1897. The importers claim said merchandise is dutiable under the provisions of paragraph 122 of said act, the pertinent provisions of which are as follows:

"Scrap steel \$4 per ton; but nothing shall be deemed scrap iron or scrap steel except waste or refuse iron or steel fit only to be remanufactured."

The evidence introduced by both sides to this controversy is voluminous, but there is no contradiction shown as to the facts involved. This merchandise consists of the shearings cut from the ends or sides of steel boiler plates. It appears that when boiler plates are taken out of the rolls at the mills the edges are ragged and uneven; that, in order to make these boiler plates commercially acceptable and practically serviceable, the

tops and sides thereof are trimmed off true, and that the pieces which fall off in this process are uniformly known in the trade as scrap. As to these rough and irregular pieces, there is no dispute; they can be used only by remelting or by piling a number of them together and subjecting them to a rolling process, by which they are welded together. Sometimes, however, in order to obtain the exact size desired for the boiler plate, or, in some cases, in order to remove portions containing holes or blemishes, it becomes necessary to subject the boiler plates, after the first trimming, to a second cutting, and the pieces imported are those which are removed from the boiler plate by this second cutting.

These pieces vary greatly in length, breadth and thickness, but have a cut edge on each side, although these edges are as a rule untrue. After importation, the pieces are separately rolled into long, thin plates, the width of the resulting plate being about the width of the piece previous to the rolling, and in some cases, before rolling, the pieces are cut into smaller pieces. The plates produced by this rolling process are used for the manufacture of tacks, trunk iron, and other small articles.

The merchandise is undoubtedly within the established definition of waste. It is spoiled or rejected portions of boiler plates, not suitable for use as boiler plates. It is not a new manufacture in the nature of a by-product, because it has not been made into anything else but steel. It is, therefore, mere waste or refuse, and the only question to be decided is as to whether or not it is "fit only for remanufacture."

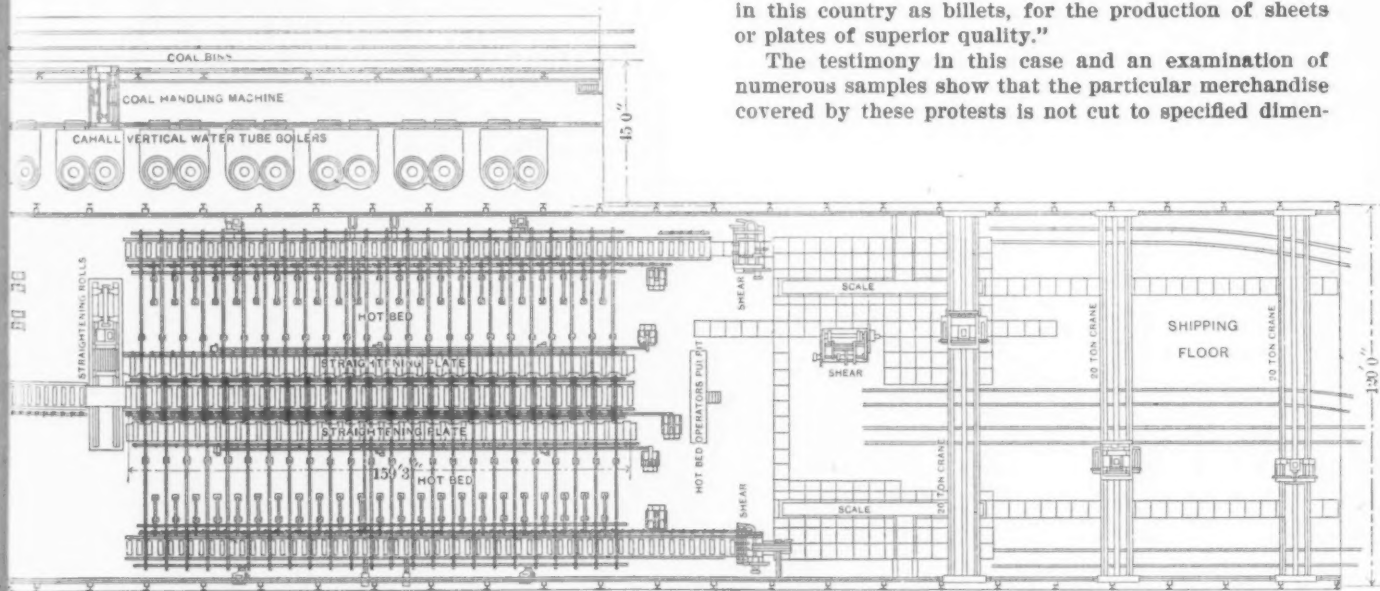
The view of the witnesses on the part of the Government seems to be that the plate mill is operated for the production of two things, viz, boiler plates and shearings, and that the scrap or refuse consists only of the pieces first removed, having a single cut edge; that, as the

have only one cut edge, than it is of those afterward sheared off, having four cut edges. The two processes of shearing produce two grades of scrap, neither of which has been specially manufactured with any particular purpose in view. The tack plates produced by rolling the shearings would be in a stage of manufacture corresponding to the boiler plates, and unquestionably would not be scrap or waste. They are material prepared for a particular use; but the merchandise as imported is not tack plates, nor has it been prepared for the purpose of producing tack plates. We are clearly of the opinion that the process to which these shearings are subjected after importation is not further manufacture, but is remanufacture, and we accordingly hold that the merchandise is waste or refuse iron or steel fit only to be remanufactured.

In G. A. 639 this board passed on similar merchandise to that here in question, and held that it was fit only for remanufacture, and in the case of *Schlesinger vs. Beard* (120 U. S., 264), the United States Supreme Court held that such merchandise was within the definition of "waste or refuse iron that has been in actual use, and is fit only to be remanufactured." In the latter case it was conceded that the merchandise was fit only to be remanufactured, and the court passed only on the question as to whether or not it had been in actual use.

In Treasury decision 21,808 the Treasury Department, in directing the collector to disregard G. A. 639 and to assess the goods as "steel in all forms," from which action of the collector this appeal is taken, gives as the reason that the decision G. A. 639 was based upon the finding of fact that the merchandise was "waste or refuse steel, fit only to be remanufactured," and had "no commercial value for any other purpose." It is further stated that the "Department is in receipt of information to the effect that large quantities of so-called steel boiler plate shearings have been imported . . . cut to specified dimensions, . . . and are used in this country as billets, for the production of sheets or plates of superior quality."

The testimony in this case and an examination of numerous samples show that the particular merchandise covered by these protests is not cut to specified dimen-



UNIVERSAL PLATE MILL AT HOMESTEAD STEEL WORKS.

THE IRON AGE

plates are not scrap, but the material for boilers, so these shearings are not scrap, but the material for tacks, hinges, &c.; that, as the making of the boiler from the plates is not a remanufacture, but a further manufacture, so the making of tacks, &c., is not a remanufacture, but a further manufacture, and that remanufacture covers only two processes—(1) melting or (2) piling up pieces and heating and rolling them together, by which they become welded into one piece.

We are unable to agree with this theory. The object of the operation of the plate mill is the production of boiler plates, which are important articles of commerce, especially adapted for one purpose. The pieces sheared off the sides and ends would not be produced if there were any way in which to avoid their production, and this is no more true of the pieces first sheared off, which

sions, but, on the contrary, is of various sizes and thicknesses, and is invariably untrue as to the edges, and, as shown above, can be used only for the purpose of remanufacture and has no commercial value for any other purpose.

For the reasons given, the protests are sustained and the decisions of the collector reversed.

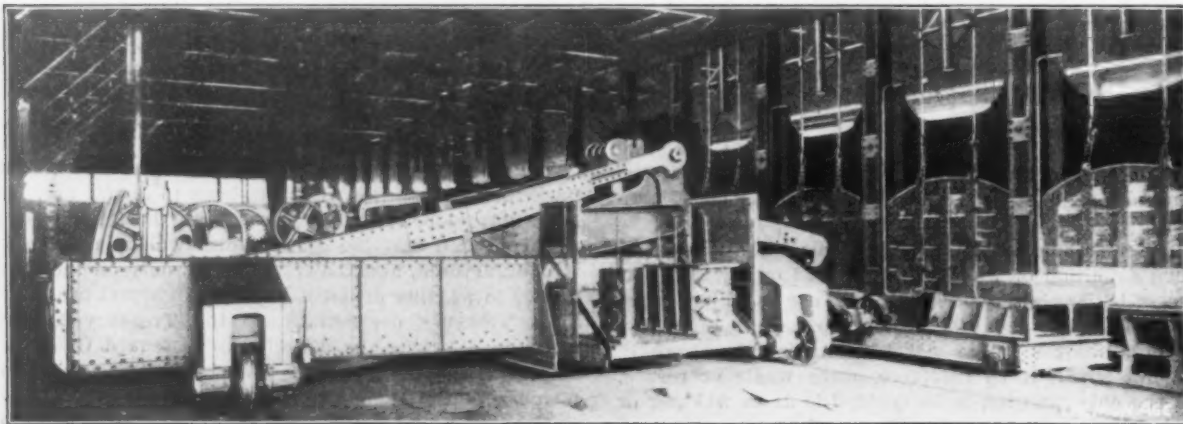
Another Rod Mill Record.—The No. 2 rod mill of the Illinois Steel Company, at Joliet, Ill., is making a great record this month. The night turn of December 10 made 240 gross tons of No. 5 rods, beating the best previous work of any other rod mill. Three consecutive shifts last week averaged 234 tons. The average for the month to the 20th was 201 tons, against 185 tons, the best previous average for a month's run.

A National Standardizing Bureau.

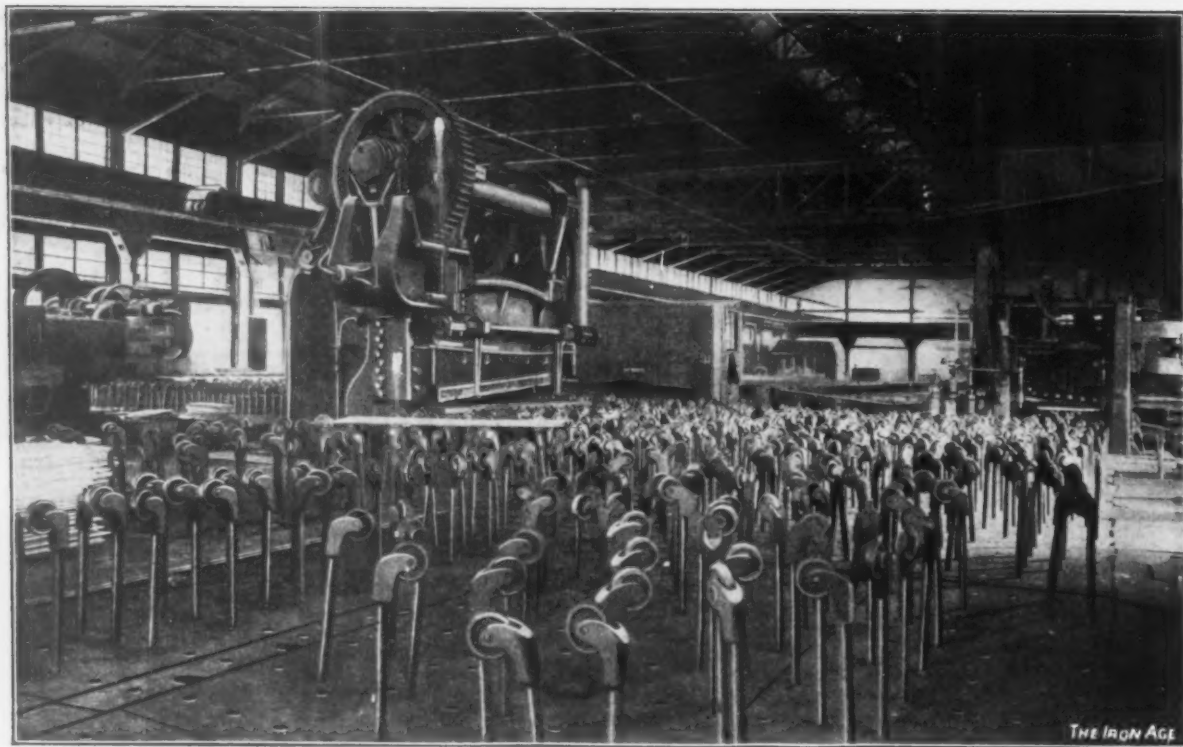
WASHINGTON, D. C., December 24, 1900.—A subcommittee of the Senate Committee on Commerce, consisting of Senators Nelson, chairman; Gallinger and Turner, has been appointed to give a series of hearings during the Congressional holiday recess to the advocates of the bill now pending in both houses for the establishment of a National Standardizing Bureau. The hearings will take place in the room of the Senate committee and will begin early this week.

The pending bill, which was originally introduced in

data are of great importance to scientific or manufacturing interests and are not to be obtained of sufficient accuracy elsewhere. The bureau is required to exercise its functions for the Government of the United States, for any State or municipal government within the United States, or for any scientific society, educational institution, firm, corporation or individual within the United States engaged in manufacture or other pursuits requiring the use of standards or standard measuring instruments, all requests for the services of the bureau to be made in accordance with the rules and regulations to be established. For all comparisons, calibrations, tests



Heating Furnaces and Charging and Drawing Machine



Shear Department.

THE HOMESTEAD 48-INCH UNIVERSAL PLATE MILL.

both Houses last spring, provides that the present Office of Standard Weights and Measures shall hereafter be known as the National Standardizing Bureau, the functions of which shall consist in the custody of the standards, the comparison of the standards used in scientific investigations, engineering, manufacturing, commerce and educational institutions with the standards adopted or recognized by the Government; the construction, when necessary, of standards, their multiples and subdivisions; the testing and calibration of standard measuring apparatus; the solution of problems which arise in connection with standards; the determination of physical constants and the properties of materials, when such

or investigations, except those performed for the United States or the State Governments, a reasonable fee will be charged according to a schedule to be prepared by the director and approved by the Secretary of the Treasury.

This bill has already been favorably reported to the House from the Committee on Coinage, Weights and Measures, which has submitted a report urging the speedy action of Congress, from which the following extract is taken:

"The introduction of accurate scientific methods into manufacturing processes necessitates the use of a far greater variety of accurate standards and standard measuring apparatus than was formerly required, and enor-

mous commercial transactions are based daily upon the reading of measuring apparatus, inaccuracies of which involve great injustice, financial losses and expensive litigation.

"At present a large proportion of the scientific apparatus used by our schools, colleges, universities and laboratories is imported, and our manufacturers of these instruments cannot compete with the manufacturers of other countries without the facilities of a suitable standardizing laboratory.

"The extensive scientific work carried on in the laboratories of the different departments of the Government requires the use of many standards and instruments of precision which cannot be procured or tested in this country, thus involving great loss of time, inconvenience and lack of uniformity.

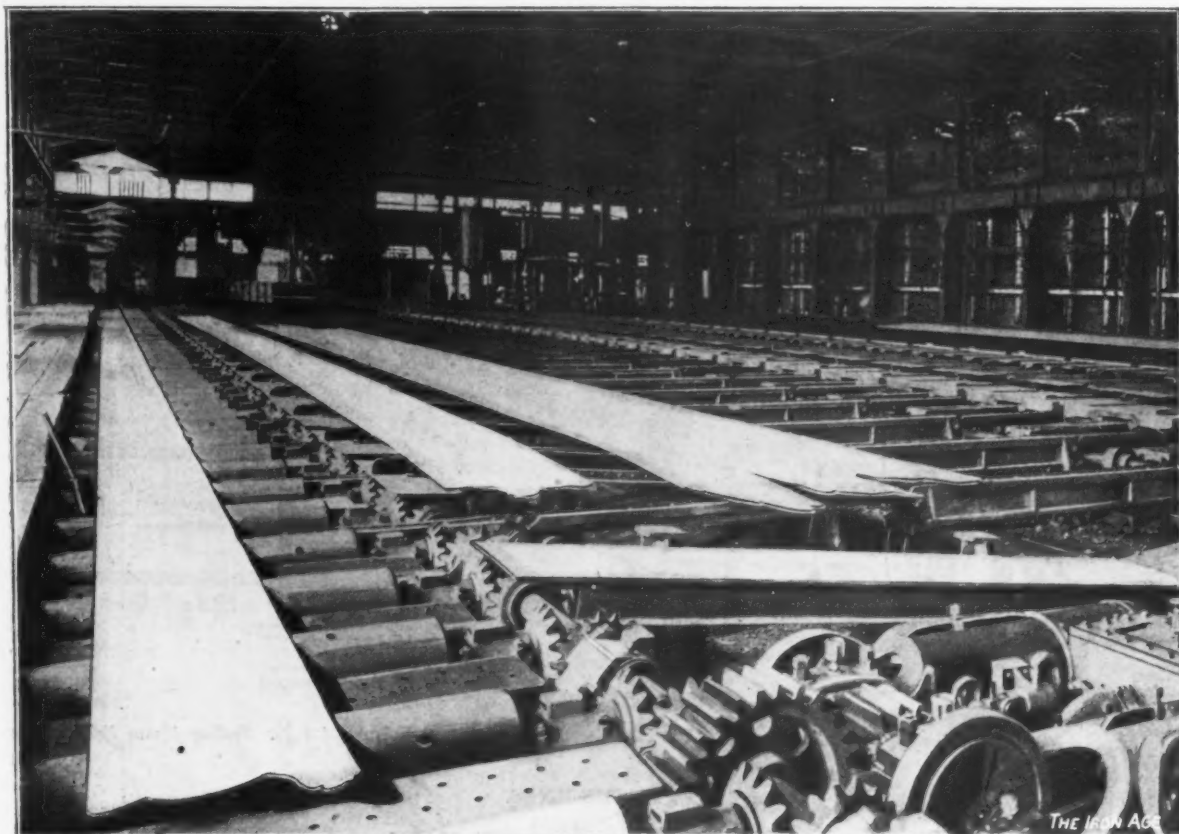
"Throughout the country institutions of learning, laboratories, observatories and scientific societies are

a place second to none in the scientific world, by the establishment of this institution, which they have unanimously requested."

The House committee expresses the opinion that the expenses of maintaining the proposed Standardizing Bureau, if properly administered, will be largely paid by fees resulting from its work. It is understood that all the witnesses who desire to appear before the Senate committee are favorable to the bill, which will undoubtedly pass both houses if time for its consideration can be secured.

W. L. C.

The Chicago Branch of Jones & Laughlins, Limited.—Jones & Laughlins, Limited, have made extensive improvements in their Western branch offices at the corner of Lake and Canal streets, Chicago. Their increased business has for some time been compelling a steady enlargement of their clerical force. This caused the office



Hot Beds.

THE HOMESTEAD 48-INCH UNIVERSAL PLATE MILL.

carrying on work of investigation and instruction in which accurate standards and standard measuring apparatus of every description are absolutely essential to success.

"The great interests above mentioned are compelled to present to utilize the far superior standardizing facilities of other governments, and the advantage to be gained in each case alone would warrant the establishment of the proposed institution.

"It is therefore the unanimous opinion of your committee that no more essential aid could be given to manufacturing, commerce, the makers of scientific apparatus, the scientific work of the Government, of schools, colleges and universities than by the establishment of the institution proposed in this bill.

"And, further, it is eminently fitting and proper that at the close of a century remarkable for its scientific discoveries and development we should show our appreciation of the labors of those careful, devoted seekers of the truth to whom we are indebted for the discovery of the fundamental laws and principles upon which our daily health, comfort and prosperity depend, and who, as teachers and investigators, have won for our country

space to become overcrowded, making more roomy quarters imperatively necessary. Being owners of the building, they have been enabled to secure the additional space desired by making means of communication with adjoining rooms, which were formerly rented to other parties and were designated Nos. 22 and 24 Lake street. The whole interior arrangements have been remodeled, with a view to securing not only more space but greater conveniences. Heads of departments now have separate rooms, thus giving them some privacy and better facilities for dispatching business. The new arrangement covers capacious file rooms, finely equipped toilet rooms and a wardrobe room, which contains a locker for each member of the office force. David N. Barker has been manager of this branch of the company's business for a number of years and has proved his efficiency by greatly extending its trade.

The official report of the finances of the Paris Exposition of 1900 shows a loss of \$400,000. The total of expenditures is \$23,300,000, and the receipts amounted to \$22,900,000. The loss is less than in the case of either of the preceding Paris expositions.

Steam Turbines.*

Their History and Development.

BY FRANCIS HODGKINSON.

Historical.

The earliest records of steam engineering are to be found among the relics of ancient Egypt. About 120 B. C. Alexandria was at the zenith of her civilization. At this time Hero, probably contemporary with Euclid and Archimedes, wrote his celebrated work, "Spiritalia Seu Pneumatica." In it he described several forms of mechanical apparatus. The use of the steam jet for accelerating combustion; the expansion of air when heated in a closed vessel; several forms of steam boilers; various hydraulic apparatus for opening and closing temple doors. The most interesting among all these is a reaction steam turbine. It consisted of a boiler, above which is a sphere mounted upon two trunnions. By means of these steam is admitted to the interior of the sphere. On the equator were attached two bent pipes, such that the issuing steam reacted upon the sphere and caused it to revolve about its trunnions. It is unknown whether this engine was ever more than a mechanical toy, although it is very possible it may have been used by the priests for driving so called magical apparatus where high speed was desirable.

The next turbine capable of any practical develop-

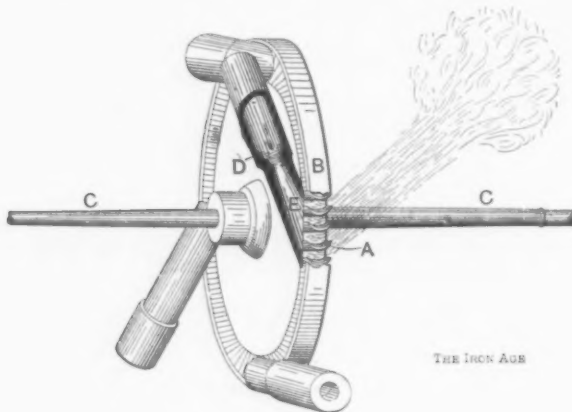


Fig. 1.—De Laval Steam Turbine.

STEAM TURBINES.

ment, and which may be regarded as the forerunner of the de Laval turbine, was invented by Blanca in 1629. It consisted simply of a jet of steam impinging upon the vanes of a paddle wheel and blowing it around. A century later, 1705, the reciprocating engine appeared, and from that time until the last few years practically nothing was done in the development of steam turbines.

Before leaving this brief historical review it is interesting to record that Mr. Parsons, with a view of exploring the possibilities of a reaction steam turbine, constructed one on the lines of Hero's engine. The sphere was replaced by two hollow oval sectional arms, mounted upon a hollow shaft, with jets at the outer ends, through which the steam issued tangentially to the plane of motion. The whole was inclosed within a cast iron case and connected to a condenser. With 100 pounds per square inch at the jets, and 26-inch vacuum in the exhaust casing, a speed of 5000 revolutions per minute was attained and 20 horse-power developed. The consumption of steam was 40 pounds per brake horse-power.

It is not a little remarkable that the latest development of steam engineering should be returning to the earliest form of engines of which we have record. It is still more remarkable that the engine, as described by Hero, had greater economy than any steam engine produced for 18 or even 20 centuries later.

The fundamental principle of the steam turbine, in contradistinction to the reciprocating steam engine, lies in the fact that the latter does work by reason of the static expansive force of the steam acting behind a piston, while in the former case the work is developed by the kinetic energy of particles of steam, which are given a high velocity by reason of the steam expanding from one pressure to a lower.

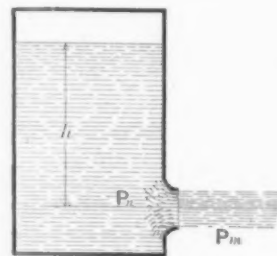
Types of Steam Turbines.

Steam turbines may be divided into three classes:

1. Impact, of which Blanca's is an example.
2. Reaction, of which Hero's is an example.
3. A combination of both of these, of which Parsons' is an example.

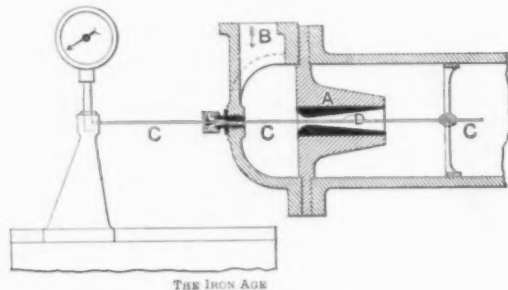
It is proposed in this paper to deal only with the two forms which have attained some degree of commercial success—namely, the Parsons and the de Laval, particularly the former.

The general principles made use of in water turbines also apply to steam turbines. The buckets and guides



THE IRON AGE

Fig. 2.—Flow through an Orifice.



THE IRON AGE

Fig. 3.—Apparatus for Testing Steam Nozzles.

must have as little skin friction as possible, and be so arranged that the acting fluid may strike without sudden shock, and have its direction of motion changed without sharp angular deflections. One difficulty, however, presents itself, and is due to the tremendous velocity of steam as compared with that of water under ordinary heads.

The laws governing the best velocity of buckets are the same as for water wheels. In the impact turbine the ideal condition is when the peripheral velocity of the buckets is one-half that of the fluid comprising the jet. In the reaction turbine this velocity must be equal to that of the jet in order to give us this ideal condition. Now with high pressure steam discharging into a vacuum the velocities obtained are from 3000 to 5000 feet per second, as calculated by Zeuner's formula. A turbine, therefore, built on the lines just enumerated would have peripheral velocities far beyond the limits of strength of material. As an example, a 10-inch Hero's engine would revolve at 75,000 revolutions per minute.

De Laval Steam Turbine.

The de Laval turbine, shown on Fig. 1, consists of a divergent nozzle which directs the jet of steam upon suitably formed buckets A, which are attached to the periphery of a revolving wheel. The outer edge of the buckets is shrouded by a steel ring, B, which prevents the centrifugal escape of the steam. The unique features of this turbine are the nozzle and the means by

* Paper read before the Engineers' Society of Western Pennsylvania.

which the wheel is enabled to revolve upon its axis of gravity. With regard to this latter point a difficulty always arises in attempting to revolve a body at a high rotative speed. It is essential in the first place that the body be accurately balanced, but in spite of all care this cannot be attained with absolute accuracy. The result is that with the ordinary shaft and bearings tremendous vibrations would be set up that would probably result in eventual rupture of the shaft. De Laval overcomes this difficulty, however, by mounting his wheel near the center of a long, light shaft, C, capable of being considerably bent and returning to its original form. The shaft is mounted upon bearings of ordinary construction. This flexibility enables the forces set up by the revolving wheel to deflect the shaft and enable the

to centrifugal forces. Experiments all show that with a jet discharging from a reservoir of high pressure into a lower pressure, where the difference is greater than 56 : 100, the pressure in the throat of the nozzle is always equal to fifty-six one-hundredths of the absolute pressure of the reservoir, no matter how great may be the difference between the two pressures.

Action of Steam in the Nozzle.

The action of steam in the nozzle may be shown by further illustration, Fig. 2. In this case if the reservoir were filled with water the velocity issuing would be found by the formula $V^2 = 2gh$, where h is the actual feet head of water above the nozzle. In the case, however, of the fluid in the reservoir being steam or gas instead of water, h must be changed to an ideal head, which is the column of fluid necessary to give the given pressure at the level of the nozzle. This ideal head is equal to the feet head of water necessary to give the pressure, multiplied by the density of the water and divided by the density of the fluid in the reservoir. This formula, however, is only approximate, and is only good up to the before mentioned limits.

With small differences of pressure, such that P_m is greater than $0.56 P_n$, Fig. 2, the fluid will issue with a velocity varying with the square root of the ideal head, which will increase as the difference of pressures increases until we reach the before mentioned condition of maximum discharge. Up to this point the steam will

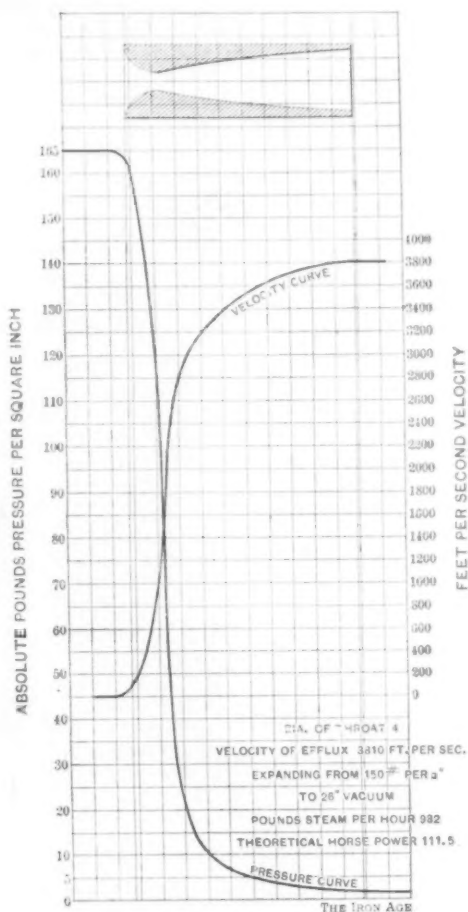


Fig. 4.—Velocity Curves.

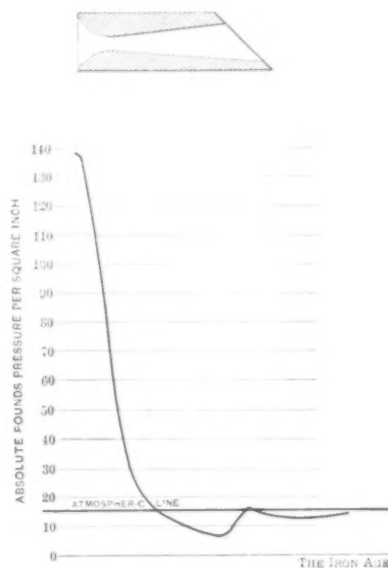


Fig. 5.—Nozzle for Discharging into Vacuum.

STEAM TURBINES.

former to revolve about its axis of gravity. The nozzle is divergent. In it the whole expansion of the steam is carried out. The steam at the mouth of the nozzle has same pressure as the exhaust. In other words, the steam has its energy completely transformed into mass and velocity by the time it comes in contact with the buckets.

This brings up another feature of the turbine, which is that, with the exception of the nozzles and the throats of the nozzles, no parts are subjected to steam pressure. It is well known that the velocity of steam flowing through an orifice, from a greater to a lesser pressure, increases as the difference of the pressure increases only up to a certain limit. This limit is reached when the lower pressure becomes less than fifty-six one-hundredths of the higher. Beyond this, however much the steam pressure be increased, the velocity of the steam remains practically the same—about 1476 feet per second. This limit of velocity is an anomaly, which seems to have been never satisfactorily explained. It is probably due to the fact that the pressure in the center of the throat is not the same as in the surrounding medium. The jet, after passing the throat, suddenly expands, and the change of direction of the fluid particles gives rise

to issue from the nozzle in substantially straight lines; this, of course, providing the nozzle has a well rounded entrance and is not a condition that might be termed "an orifice in a thin plate."

When the pressure is increased beyond this the steam expands partially outside the nozzle, and the particles cease to issue in a straight line as before. This subsequent expansion is taken advantage of by de Laval by means of his divergent nozzle, which is of the form shown in Fig. 1.

The throat is at D, having a well rounded entrance, and from there on the nozzle diverges. The relation of the area of the outlet at E to the area of the throat at D should satisfy the equation:

$$\frac{F_m}{V_m} = \frac{F_2}{V_2}$$

F_m = Sectional area of the throat.
 F_2 = Sectional area of the outlet.
 W_m = Velocity of steam at throat.
 W_2 = Velocity of steam at outlet.
 V_m = Specific volume of steam at inlet.
 V_2 = Specific volume of steam at outlet.

This equation simply states that equal weights of steam pass at both the throat and the outlet in equal

intervals of time. Practically a nozzle must be made with the area at the exhaust end as small as possible, for the sake of getting the greatest velocity, but just so large that the pressure will not be higher than that of the exhaust pipe.

The best length of nozzle is hard to determine. If too long, there will be considerable loss of velocity due to skin friction. At the same time it must be long enough to admit of proper expansion of the steam. The best shape of the divergency has been the subject of investigation by various experimenters, in order to give the best expansion curve, regarded as a single particle. The writer's opinion is that the best results in this respect

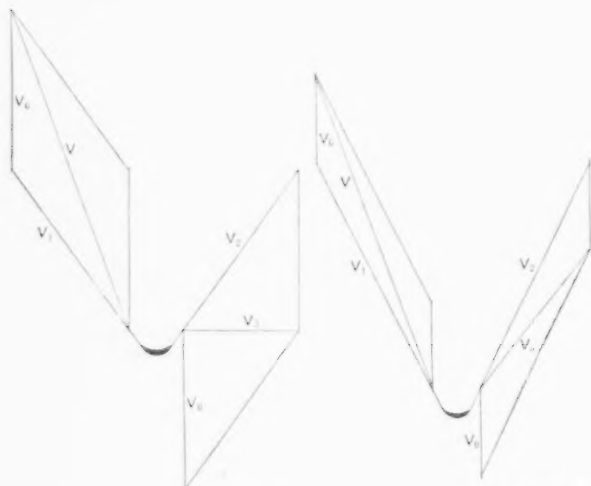


Fig. 6.—Parallelogram of Velocities.

Fig. 7.—Actual Diagram.

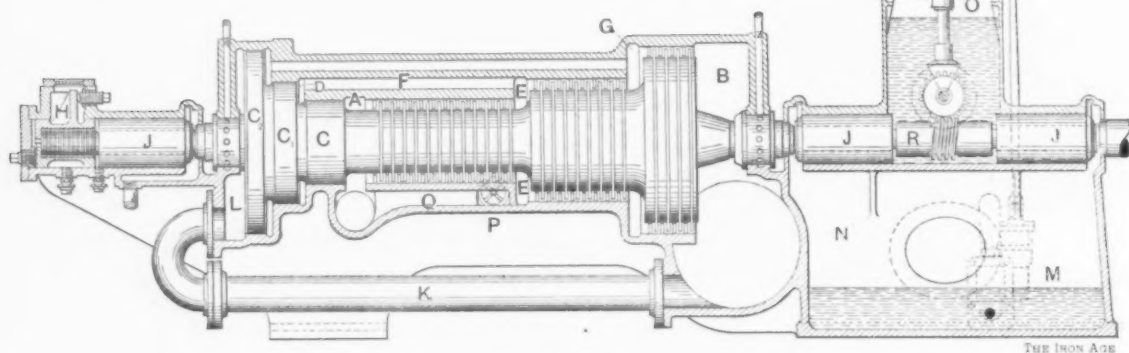


Fig. 8.—Westinghouse-Parsons Steam Turbines.

STEAM TURBINES.

are obtained by a nozzle whose section is very near an ellipse.

Performance of Steam Nozzles.

The investigation of the performance of steam nozzles is particularly interesting. The apparatus usually employed is shown in Fig. 3. The nozzle for the experiment is at A, the steam entering at B, discharges through the nozzle directly into the exhaust pipe. At C is provided a small searching tube, sealed at one end and with a minute hole, D, some distance from this end. At the other end is provided a suitable pressure gauge or mercury column. Means are provided for sliding the searching tube with its pressure gauge back and forth, when pressures may be read with the hole in the searching tube in different positions throughout the length of the nozzle. From these figures a curve of pressures may be developed and from this, together with knowledge of the weight of the steam passing the nozzle per unit of time and the exact form of the nozzle, a second curve may be developed which will give some idea of the velocities of the fluid.

The curves on Fig. 4 give an example of this. They have, however, been developed theoretically on a basis of adiabatic expansion, that all the energy of the steam between the limits of pressure—viz., 150 pounds gauge pressure and 28 inches vacuum—has been converted into velocity and that there are no losses due to skin friction or through loss of pressure by low coefficient of efflux. This coefficient of efflux is a feature of the entrance to the nozzle and varies from 50 per cent. in an orifice in a thin plate to 98 per cent. in a well rounded orifice, as is shown in Fig. 4.

The pressure curve is an adiabatic expansion line from the throat to the outlet, and the pressure of the throat 0.56 time the absolute pressure of the steam before entering the nozzle.

The velocity at the mouth of nozzle is shown to be 3810 feet per second and 982 pounds of steam passing per hour; diameter of throat, 4-10 inch; theoretical horsepower, 111.5. In actual practice as much steam as this could not be made to pass for the reasons just given, so the nozzle would require some modification in consequence.

Of course, in these investigations allowance must be made for the area of the searching tube. Fig. 5 shows an actual example of a nozzle designed for discharging into vacuum, but used for discharging into atmospheric pressure, and shows how the steam reaches near the condition of vacuum near the outlet and afterward rises to the exhaust pressure. This feature is to a certain extent taken advantage of in a de Laval turbine, designed

for running noncondensing. The nozzle is slightly over-compounded so that the wheel may revolve in a partial vacuum. Some gain in economy is the result, by reason of the wheel revolving in a less dense medium.

In the de Laval turbine the nozzles are set at an angle of 20 degrees with the plane of motion of the buckets, which is as acute an angle as is possible.

Action of Steam on the Buckets.

The action of the steam on the buckets may be shown by the diagram of parallelogram of velocities, Fig. 6, which shows an ideal condition which could seldom be obtained in practice.

V is the direction and velocity of the steam issuing from the nozzle.

V_0 the velocity and direction of the buckets.

Component V_1 is the relative angle and velocity with which the steam strikes the bucket.

V_2 is the relative direction and velocity of the steam leaving the buckets.

V_3 is therefore the absolute direction and velocity of the steam leaving the buckets.

It will be observed here that V_2 is a horizontal line, so that the combination is one of maximum efficiency, the only losses being due to the angularity of the nozzle. By reason of the tremendous velocities of steam, a diagram similar to Fig. 7 is what is generally obtained in practice. It will be noted that the angle of the bucket at the entrance corresponds with that of the component V_1 . It is usual to have the angle of outlet making an angle with the plane of motion equal to that of the inlet with the same plane, thus taking away practically all end thrust.

These turbines, especially the larger sizes, are equipped with several nozzles, some of which are provided with independent stop cocks, such that the number of nozzles in operation may be adjusted to suit the condition of running. In order to obtain the most suitable steam pressure in the throats. These turbines are essentially of very high speed. The smaller sizes run about 30,000 revolutions per minute and are geared down to about 3000; the larger sizes about 10,000 revolu-

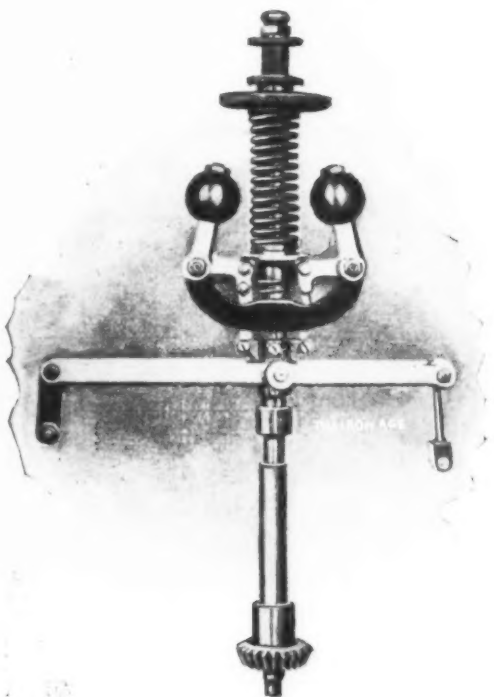


Fig. 10.—Governor.



Fig. 9.—Bearings of Turbine.

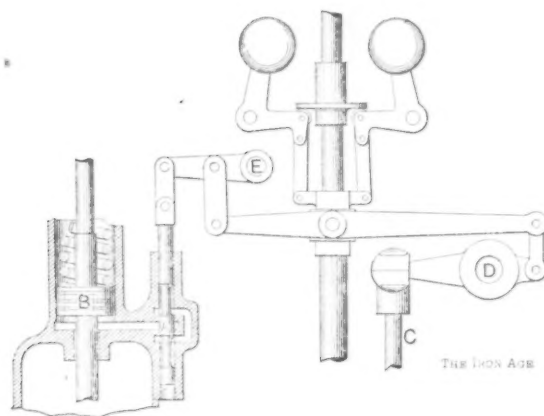


Fig. 11.—Diagram of Governor Levers.

STEAM TURBINES.

tions per minute. The peripheral speed of the wheel is usually from 600 to 1200 feet per second.

The reduction of speed is accomplished by means of a pair of helical spur gears with the angle of helix 45 degrees. These gears form by far the biggest part of the whole outfit. The remaining portions of these turbines have no remarkable features. The regulation is effected by means of a fly wheel governor, which is on the slower running shaft and wire draws the steam at the admission.

Some tests of a 10 horse-power turbine were communicated to the American Society of Mechanical Engineers in 1895, in which the turbine described had four nozzles of 0.138 diameter and one of 0.157 diameter of throat. The nozzles were 2 inches long from throat to outlet.

The speed of the turbine was 23,771 revolutions per minute, reduced by gearing to 2400. The economy full load, non-condensing, was 47.8 pounds per brake horse-power. This economy is by no means bad when the small power of the outfit is considered. In December, 1899, some tests were made in France, under the following conditions: 192 pounds boiler pressure, with 69 degrees F. of superheat; mean horse-power, 307.8; revolutions per minute, 772. The consumption of steam was 13.92 per effective horse-power.

Parsons Steam Turbine.

The first Parsons steam turbine and generator was built in 1884. It developed 10 horse-power at 18,000 revolutions per minute. It ran for several years in Gateshead-on-Tyne, England, supplying current for the manufacture of incandescent lamps. It is now in the South Kensington Museum. It consisted of two groups of 15 turbines each, the steam entering between them and passing in opposite directions through each group.

Fig. 8 is a general longitudinal section through a Westinghouse-Parsons steam turbine. The steam enters at the governor valve and arrives at the chamber A, and passes out to the right through the turbine blades, eventually arriving at the exhaust chamber B. The blades are shown in Fig. 13, the steam passing first to a set of stationary blades and impinging on the mov-

ing blades, driving them around, and so on. The areas of the passages increase progressively in volume, corresponding with the expansion of the steam. They will, however, be described more fully later. On the left of the steam inlet are shown revolving balance pistons C, C and C, one corresponding to each of the cylinders in the turbine, which, according to size, may be one, two, three or four in number. The steam at A presses against the turbine and goes through, doing work. It also presses in the reverse direction, but cannot pass the piston C; but at the same time the pressure, so far as the steam at A is concerned, is equal and opposite, so that the shaft is not subjected to any end thrust. The pressure at D is equal to that at E, by reason of the balance port F, so, similarly, so far as the steam pressure at E is concerned, there is no end thrust. This same fact also applies to G. The area of the balance pistons is so arranged that no matter what the load may be, or what the steam pressure or exhaust pressure may be, the correct balance is preserved and the shaft has no end thrust whatsoever.

At H is shown a thrust bearing, which, however, has no thrust to take care of, but serves to maintain the correct adjustment of balance pistons. The thrust bearing is in two halves, the lower half being capable of adjustment in one direction, the upper one in the reverse.

The balance pistons never come in mechanical contact with the cylinder, and consequently there is no friction. The thrust bearing has ample surface, and besides is subjected to forced lubrication and does not wear. The adjustments once made always remain good.

There is obviously some leakage past the pistons, but it is found to be very small. Centrifugal force seems to have something to do with keeping down this leakage. The particles endeavoring to escape have to pass radially inward in going through the small clearance. It is supposed, then, that the rapidly revolving pistons have the effect of throwing outward the particles with which they come in contact by reason of skin friction, so that the particles being slung outward tend to oppose the escape of the particles inward. This theory, however, is somewhat imaginary, but in view of the economy obtained, the leakage cannot be very great.

At K is a pipe connecting the back of the balance pistons at L with the exhaust chamber, Fig. 8, to in-

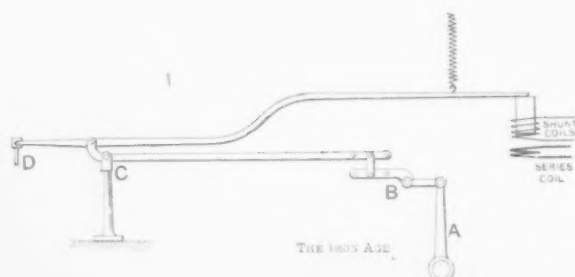


Fig. 12.—Diagram of Electric Governor.

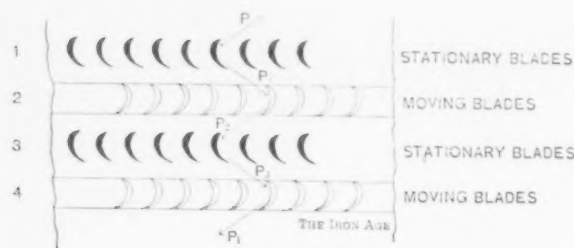


Fig. 13.—Blades of Turbine.

these. In larger sizes it is generally a modification of this arrangement. The governor gear and oil pumps generally receive their motion by means of a worm wheel, gearing into a worm cut on the outside of the coupling.

At N is an oil reservoir, into which drains all the oil from the bearings. From there it runs into the pump M, to be pumped up to the chamber O, where it forms a static head, which gives a continuous pressure of oil to the bearings. The pump is single acting, of the simplest possible construction, that will not become deranged. The oil runs in by gravity, so that it is unlikely to fail to continue pumping.

A by-pass valve is provided, shown at P, which admits high pressure by means of port Q to the steam space E. By opening this valve as much as 60 per cent. overload may be obtained, and in the case of turbines operating condensing full loads may be obtained should the condenser be at any time inoperative, due to any cause, and the turbine allowed to exhaust into the atmosphere. Naturally the effect of opening the by-pass valve is to reduce the economy to an extent that will be seen later when discussing economy.

The glands consist of packing rings set in grooves cut in the shaft. The rings press outward and remain stationary. Any form of frictionless packing necessa-

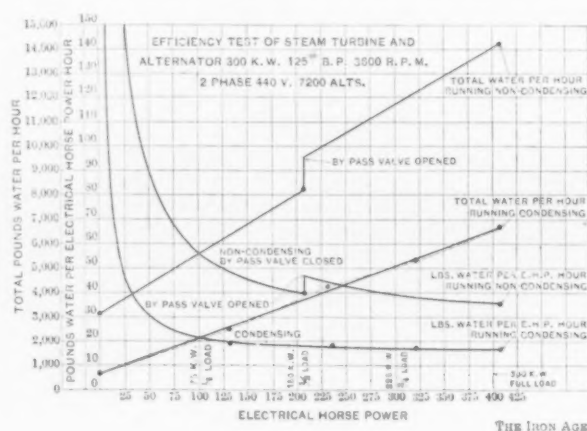


Fig. 14.—Economy Curves.

STEAM TURBINES.

sure the pressure at this point being exactly the same as that of the exhaust. At J are shown the bearings. They are also shown separately on Fig. 9. They are unique in construction. The bearing proper is a gun metal sleeve, which is prevented from turning by a loose fitting dowel. Outside of this are three concentric tubes, having a small clearance between them. This clearance fills up with oil and permits a vibration of the inner shell, at the same time restraining it. The shaft, therefore, revolves about its axis of gravity instead of the geometric axis, as would be the case were the bearing of every day construction. The journal is thus permitted to run slightly eccentric, according as the shaft may be out of balance. This form of bearing in a very remarkable manner performs the functions of de Laval's slender flexible shaft. But in this case the shaft is built as rigidly as possible, so it is not liable to crystallization, which would result in eventual rupture.

The bearings have ample surface, are continuously lubricated under pressure, and it has been found in practice that they do not wear. As may be seen in Fig. 9, they are surrounded by an outer cast iron sleeve, in which are fitted keys which may be shimmed up and permit any adjustment of the position of the shaft relative to the cylinder.

At R, Fig. 8, is shown a flexible coupling, by means of which the power of the turbine is transmitted. In small sizes the two shafts have a square cut on the ends, the coupling itself somewhat loosely fitting over

rily leaks a little. In the case of the turbine exhausting into a vacuum, a little live steam is admitted between the rings by means of a small reducing valve, so that the leakage consists of a negligible quantity of live steam, instead of air, which would impair the vacuum.

In case of the turbine exhausting against anything above atmospheric pressure a small ejector is provided, which drains the leakage steam from between the packing rings and allows it to drain through a suitable drain pipe, instead of escaping into the engine room.

Governor.

In all engines the governor is an important consideration. A fly ball type of governor is made use of, as shown in Fig. 10, and has several features conducive to good regulation. The ball levers are swung on knife edges in lieu of pins. The governor works both ways—that is to say, the midposition of the levers is admitting a full head of steam to the turbine. A movement from this in either direction is tending to cut off the supply. This serves a useful purpose in the event of a very excessive load coming on the turbine, such as a short circuit, which has the effect of bringing down the speed more than the percentage variation permitted by the adjustment of the spring, when the steam immediately becomes shut off. Again, in such an event as some of the governor driving mechanism becoming broken and the governor balls slowing up independently of the turbine, the steam is shut off before any damage could take place.

The speed of the turbine may be varied within all the limits of the governor spring while the turbine is running. This is particularly useful in bringing alterations in synchronism and adjusting their differences of load when in multiple. This is accomplished by grasping the top knurled head, when, by means of a ball bearing shown, the spring and tension nuts remain stationary. Any adjustment of the spring nuts may then be made, without in any way disturbing the running of the turbine, other than making the change that may be desired.

The arrangement of the governor levers is shown diagrammatically in Fig. 11. They are attached to a small relay valve, A, which controls steam below the piston B, which is directly connected to the main admission valve. The levers receive reciprocating motion at C from an eccentric, and use the governor clutch as a fulcrum, points D and E being fixed. Continuous reciprocating motion is thus given to the relay valve. This is in turn transmitted to the admission valve. The function of the governor is to vary the plane of oscillation of the relay valve, which causes the admission valve

speaks well for the low friction, but is principally due to the tremendous fly wheel effect of the shaft. All the power is transmitted rotatively; there are substantially no reciprocating parts and no vibrations, hence no costly foundations and no holding down bolts are necessary.

Mr. Parsons made very successful use of an electrical governor which was attached to a relay valve working in exactly the same manner as just described. The arrangement of the levers is shown in Fig. 13. Reciprocating motion was given at A, points B and C being fixed. On the extreme right is hung, by means of a spring, a core working in a solenoid. When in operation the relay valve D oscillates continuously and the core moves a very small amount by reason of its mass. At the same time it is ready to respond to any change of magnetic pull. One great feature of this governor is that the solenoids may be compounded so as to give constant electro-motive force at the terminals of the generator, the turbine running faster at full load than at light load to make up for copper losses in the armature. The governor may be further overcompounded to give the percentage rise, just the same as an overcompounded gen-

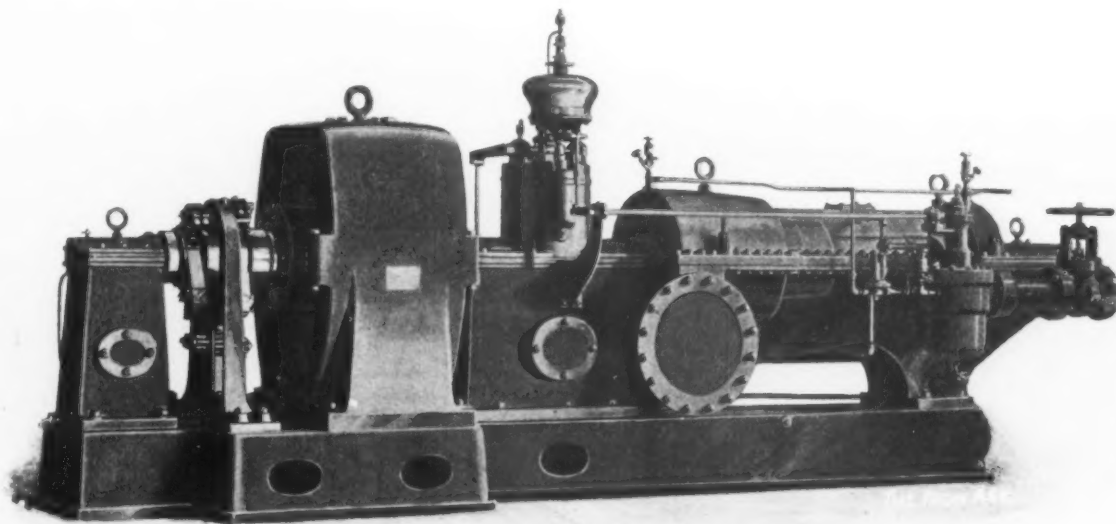


Fig. 15.—Turbine and Generator.

STEAM TURBINES.

to remain open for a longer or shorter period, according to the position of the governor. The steam, therefore, is admitted to the turbine in puffs, which occur at constant intervals of time. The puffs are either of long or short duration, according to the load. At full load the puffs merge into an almost continuous blast.

The advantages of this intermittence are threefold. The turbine is at all times using boiler pressure steam, no matter what the load may be. The admission valve is continuously in motion and consequently gets no opportunity to get stuck.

The power to work the relay valve and overcome the inertia of the levers is transmitted through the governor clutch, hence the balls are moved in and out a very small amount at every oscillation of the levers, so that the governor levers in respect to their motion about their points of suspension are never at rest, and consequently when a change of load comes the governor does not have to overcome the friction of rest and is always ready to go to its new position. These features are particularly valuable. So long as a piece of mechanism is continuously working we at least know that it is in a condition to continue working and is not stuck.

There is absolutely no variation of angular velocity in the turbine, which is necessarily present in reciprocating engines, hence the value of turbines for running alternators in multiple. This can be realized when we know a 500 horse-power turbine will run 20 minutes after the throttle has been closed. This, of course,

erator. In alternating current work the series coil is obviously separated from the shunt coil. This latter is in shunt with the exciter and the series coil is usually placed above, having a separate laminated core. The adjustment of variations of electro-motive force between no load and full load may be conveniently made by changing the amount of iron in the series core.

Turbine Blades.

The essential parts of the turbine are, of course, the blades and buckets. They are made of hard drawn material. They vary in size from $\frac{1}{2}$ to 7 inches, according to where they may be used. Every row of these blades has passages of increased area, corresponding with the volume of the steam. This increase of volume is obtained by increasing the heights of the blades, and when these have reached the desired limit the diameter of the turbine is increased and the steam permitted a higher velocity that enables the blades to recommence another progression.

Considering one barrel of the turbine, the fall of pressure, or, to be more exact, the coefficients of expansion, are the same for every row.

Referring to diagram, Fig. 13, the steam at pressure P in expanding through row 1 to pressure P₁ converts its energy into velocity and impinges upon the moving blades, row 2. The steam then performs a second expansion in expanding through row 2, again converting its energy into velocity, but this time the energy of the

efflux is to react upon the blades from which the steam issues. The same cycle is repeated in 3 and 4, and so on until exhaust pressure is reached. The moving blades therefore receive motion from two causes, the one due to the impact of steam striking them, the other due to the reaction of the steam leaving them, and in this respect is this turbine a combination of Bianca's wheel and Hero's engine.

Many people suppose that these blades wear under the action of steam. Experience shows that they do not. In the case, however, of a nozzle, such as has already been described, in combination with the blades, the result is very different, by reason of the tremendous velocity of the steam. The wear even then is not much when superheated steam is made use of, but with any entrained water the wear is quite rapid. In the Parsons turbine the velocities of steam never exceed 500 to 600 feet per second, and for the most part are considerably less than this.

The blades are secured by calking. Experiments show that the pull necessary to pull them out is as much as the elastic limit of the material of the blades them-

31,073 blades in the turbine, of which 16,095 are moving blades. The pressure that each of them exerts in revolving the shaft varies from 0.89 to 1.04 ounces.

The steam inlet is always provided with a steam strainer, which is intended to prevent foreign substances from getting into the turbine by means of the steam pipe. Generally such things as nuts, bolts, monkey wrenches, &c., as have occasionally been known to come through a steam pipe cause practically no damage, because they cannot pass the first row of guide blades. The greatest inconvenience of this nature is small pieces of gasket choking up the guide blade passages, which appreciably brings down the power.

As has been already stated, a jet of steam issuing through a properly constructed orifice has as much energy as the same steam performing high ratios of expansion behind a piston. In both cases the weight to be theoretically abstracted from a given weight is the same; however, there are some practical reasons for expecting better results in the case of the turbine.

In the design of a three or four stage compound condensing reciprocating engine it is found that there is no

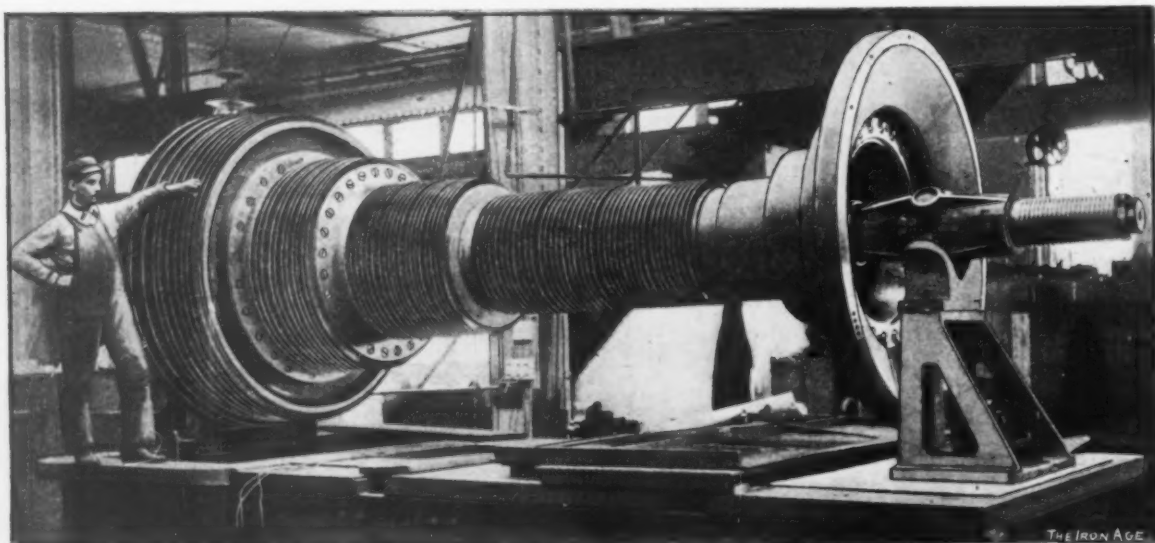


Fig. 16.—Revolving Part of Turbine.

STEAM TURBINES.

selves. The strain to which they are subjected in practice is about one-fortieth of this amount.

Danger of the blades colliding sideways is very remote. The smallest blades have $\frac{1}{8}$ inch clearance sideways and the largest as much as $\frac{1}{2}$ inch. These dimensions are far beyond the limits of lateral motion permitted by the balance pistons. Of course accidents do happen to the blades, but are generally attributable to carelessness, such as the machine having been taken apart and in handling some of the blades damaged, the machine being again assembled without having the damage repaired. The result of this, however, is less serious than would be expected. At the most two or three rows are ripped out. The blades are very tough, and the first broken blades close up the passage in the succeeding guide blades and prevent the broken pieces passing and causing more damage.

In the event of such an accident the damaged blades may be removed and the machine put into service, when full power can be developed, but, of course, at a somewhat less efficiency, according to the number of rows missing. The blades may be permanently repaired in a very short time by chipping out the grooves and inserting new blades. This work can be done wherever the machine may be in service, as no special machine work is necessary. Such accidents, however, are among the improbabilities.

It may be interesting to record the actual pressure exerted on individual blades in a turbine. Take, for example, one of 300 kw. capacity. There are altogether

gain in economy by expanding the steam in the low pressure cylinder beyond a terminal pressure of about 5 or 6 pounds, absolute. To do so means very much increasing the volume of the low pressure cylinder, thus increasing the friction of the engine and the weight of the reciprocating parts. Moreover, the temperature of saturated steam, as these low pressures are reached, falls off much more rapidly, hence there are greater losses, due to condensation and re-evaporation, than would be gained by a more complete expansion. In the steam turbine no such limits exist. The extra volume of the low pressure end does not add to the friction. The temperature conditions from end to end remain always the same, and hence such losses as condensation and re-evaporation are not in evidence.

Turbines are constructed to utilize the energy of the steam down to the utmost limits. A condensing steam turbine, when in operation, affords a striking example of the conversion of heat into energy. The temperature of the walls of the cylinder at the high pressure end, about 365 degrees F., falls in the distance of 3 or 4 feet to a temperature of about 126 degrees at the low pressure end.

Economy of Steam Turbine.

The diagram, Fig. 14, shows some economy curves developed from tests made on one of the 300 kw. turbines now in operation at the Westinghouse Air Brake Company's works. The results may be summarized as follows:

Full load, 16.4 pounds steam per E. H. P. hour.
 Three-quarter load, 17 pounds steam per E. H. P. hour.
 One-half load, 18.2 pounds steam per E. H. P. hour.
 One-quarter load, 22 pounds steam per E. H. P. hour.
 Running light, 750 pounds per hour.
 Vacuum, 26 to 27 inches.
 Boiler pressure, 125 pounds per square inch.
 R. P. M., 3,600.

The consumption of 16.4 pounds at full load is in itself remarkable, but such results as at the light loads have never been approached before. It may be said that the consumption at one-half load is only 10 to 12 per cent. greater than at full load.

It must not be lost sight of that these results are per electrical horse-power. It is usually the custom of engine builders to publish their results per indicated horse-power, which means very little to the power user. He is chiefly interested in the economy of steam per unit of power he gets out of his power plant, not the steam per unit of power he has to put into it.

To make a comparison with a reciprocating engine and assume the efficiency of transmission from the steam

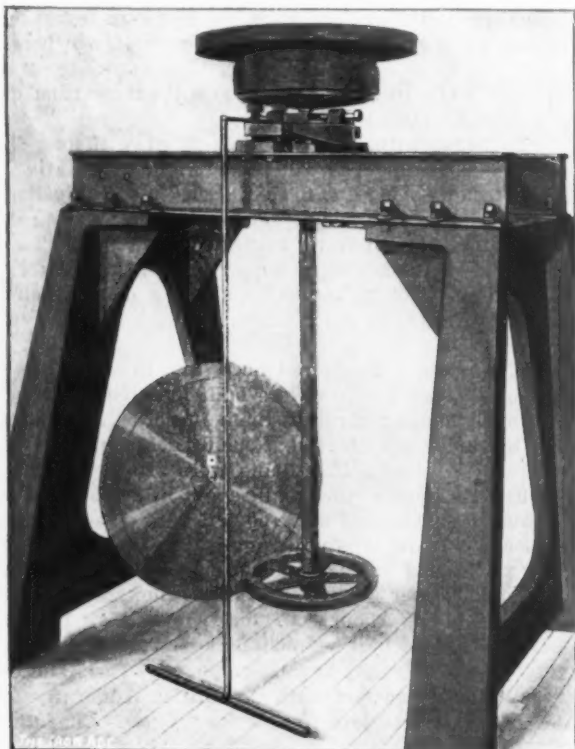


Fig 17.—Ring Balancing Apparatus.

STEAM TURBINES.

cylinders to the switchboard to be 85 per cent., which is about the very highest obtainable, would bring the full load water rate on the turbine just described to 14 pounds per indicated horse-power. The tests were made under ordinary conditions so far as dryness of steam is concerned, the boilers being some distance away and no allowance made for wetness of steam.

On the curves are shown a set of lines showing the efficiency when running noncondensing. These results are somewhat inferior by reason of this particular turbine being designed essentially for condensing. Nevertheless, the results are not so bad as to preclude it being operated under these conditions, should at any time the condenser be out of order. A turbine designed for running noncondensing gives proportionately as good results as the condensing curves shown on the diagram.

By this set of curves may be observed the function of the by-pass valve, how when running noncondensing the by-pass valve remained closed until about half load was reached. Upon being opened the efficiency fell off as shown, and continued to improve from there on as the load increased. The overload capacity of the engine is obviously more flexible than that of most engines.

Superheating may be made use of with considerable gain in economy and without the usual difficulties. There

are no internal rubbing surfaces and no packing glands to become injured by the high temperature. Sixty to 70 degrees of superheat improves the economy by some 20 per cent.

In this connection Professor Thurston has lately recorded some experiments with a de Laval turbine. For every 3 degrees F. of superheat 1 per cent. of gain in economy was attained. With 37 degrees of superheat the capacity of the turbine was doubled. This gain he attributes almost entirely to the reduction of skin friction.

The practical efficiency of a turbine power plant may be gathered by some tests made by the Westinghouse Air Brake Company. After the plant had been installed some nine months the whole plant was shut down, and the steam engines which had been previously doing the work were connected up again, put in service and were kept running a week, during which time careful measurements were taken of fuel and water. After this the turbine was again put in operation and similar measurements made with the electrical transmission. The saving in coal averaged 35.7 per cent. during the day and 36.4 during the night in favor of the turbines. The saving in feed water averaged 29.8 per cent. during the day and 41.4 per cent. during the night. In round numbers this means a saving of 4000 pounds of coal in 24 hours.

The gain is in a great measure due to the economy of the turbines, but also to some extent to the elimination of the condensation in long lengths of steam pipe and to the advantages of electrical transmission.

The turbine and generator of this plant are shown separately on Fig. 15. The total weight is about 25,000 pounds; total length, 19 feet; width, 4 feet 3 inches.

Lately a 1000-kw. outfit has been built by C. A. Parsons & Co. for the Elberfeld Corporation, in Germany. At 1200 kw., 130 pounds boiler pressure, 18 degrees F. of superheat, the turbine driving its own air pump, &c., an electrical horse-power was produced for 14.025 pounds. This is probably the highest economy ever attained in any steam engine.

Fig. 16 shows the complete revolving part of a 3000 horse-power turbine. Its weight is 28,000 pounds; length over all, 19 feet 8 inches; 12 feet 3 inches between bearings; the largest diameter, 6 feet. The turbine of which this forms a part is being set up in the power house of the Hartford Electric Light Company. It is direct connected to a 1500-kw. generator, the total outfit having the following dimensions—viz.: 33 feet 3 inches long, 8 feet 9 inches wide; 175,000 pounds total weight, including generator. This is the largest steam turbine in one integral part ever built.

Advantages of Steam Turbines.

As there are no rubbing surfaces in the turbine no internal lubrication is necessary. This enables surface condensers to be employed and the condensed water used for boiler feed without fear of getting grease into the boilers.

The turbine is entirely automatic in all its functions and requires remarkably little attention. The only real working part is the spindle revolving in its bearings. These bearings are found to wear but little, if at all; so the cost of renewals and repairs is very small.

In 1897 the Newcastle & District Electric Lighting Company published their costs in this regard. The power house contained 11 turbines of 75 to 150 kw. each. The cost of repairs and renewals amounted to 26 cents per kilowatt per annum, and included all repairs to boilers, turbines, condensers, pumps, generators, cables, fittings, &c.

By reason of the turbine making use of the last available expansion of steam there is considerable advantage in employing the highest vacuum. For instance, considering the 300-kw. turbines described and assuming the steam consumption with 27-inch vacuum to be 16.35 pounds per electrical horse-power, it may be reasoned upon a thermodynamic basis that with the same machine designed for 25-inch vacuum the consumption would be 18 pounds per electrical horse-power hour. On the other hand, by designing the same turbine to suit an exhaust pressure of one-thirtieth of an atmosphere, or say 29-inch vacuum, the consumption would come down to 14.12 pounds per electrical horse-power hour.

The applications of steam turbines are perhaps not so universal as ordinary steam engines. They are pre-eminently suitable for driving electrical machinery, particularly alternating current dynamos. Some difficulties are, however, experienced with the commutation of continuous current generators of fairly large powers. There is nothing remarkable in the design of generators for this purpose except that modification necessitated by the high speed. For this reason they are remarkable for their small weight and dimensions and the absence of crowded pole pieces.

Builders of electrical machinery have for some years been working in the direction of reducing speeds from the old belt driven rigs to admit of direct connection to slow going reciprocating engines. The condition for steam turbines, is, however, a step in the reverse direction. Turbines have been used with good success in England for driving fans and blowers.

Balancing Revolving Parts.

Although the type of bearing employed is capable of successfully dealing with about any reasonable error in balance, at the same time it is very essential that the revolving parts be very accurately balanced, in order that the collector rings and commutators may run true, and that the clearance between the tips of blades and walls of the turbine cylinder may be maintained as fine as possible, so that balancing forms quite an important stage of the construction and has many interesting features. The usual method of balancing, which consists of rolling the pieces on some ways and thus locating the heavy side, is sufficiently accurate for ordinary slow speed work, but no degree of real accuracy can be attained.

Attempting to balance a body such as the above by such methods might result in a heavy spot at two opposite sides and two opposite ends, which would be anything but a condition of good running balance. It is therefore found desirable to split this up into comparatively narrow rings and balance each separately, when the above error would become negligible. For balancing such rings the Westinghouse Machine Company have devised a machine which performs the work with remarkable accuracy. It is shown in Fig. 17, which shows a ring in place on the turntable. The turntable is pivoted on a beam, which is in turn hung on two knife edges. Below the turntable is rigidly attached an adjustable counterweight. The turntable, of course, is free to turn independently of all this. Means are provided to slide the whole turntable and counterweight in the beam and in a direction at right angles to the line of the knife edges.

The counterweight is adjusted to bring the combined center of gravity in a plane close to the knife edges. Then by sliding the mass in the beam the table may be made to rest horizontally. Then by giving the turntable one-half revolution the table will fall over by twice the amount it is out of balance. Readings are taken in two opposite directions, and the exact location and the amount of the error may be immediately figured. Balancing by this method may be done very rapidly and with surprising accuracy. A ring weighing 6000 pounds has been balanced with 2 ounces, and rings weighing 200 or 300 pounds within $\frac{1}{8}$ ounce. In the case, however, of the revolving parts of electric generators the final winding, &c., is liable to throw it out of balance, and then there is no alternative but to balance it in its entirety. The shape is generally of the nature of a long cylinder with a journal at both ends. The only way then to do this balancing is to deliberately mount it on bearings, which are preferably set on springs, and running it up to speed by belt or any available means. While running it is marked with a colored pencil at different points, which serve to indicate where to add weight.

A small body revolving at 5000 or more revolutions per minute the light side is always the side that comes outward, so that weight should be added just where the marks come. In some cases the marks are opposite at each end, when weight needs to be added on one side at one end and on the other side at the other end. These facts show that when the high speeds are reached the body ceases to revolve on the geometric axis and takes the axis of gravity.

On its way up to speed there is generally some point

at which there is considerable vibration. This is termed the critical speed and seems to come at the time when the body is changing its axis of revolution. These critical speeds become lower as the bodies are heavier and of greater radius. In the cases of heavier and bigger bodies, which also would have a lower rotative speed, the marks do not come just on the light side. They may come sometimes as much as 90 degrees ahead of the light side. The exact angle can only be found by experiment, and at best this is only a cut and try method. With experience, however, work may be put in very accurate balance.

Steam Turbines on Vessels.

The application lately of steam turbines to marine propulsion is well known. Some particulars of the vessels equipped may be interesting. The first vessel, named the "Turbinia," was built with a view of exploring the possibilities of turbines for this purpose. It was, therefore, built as small as possible, and at the same time not so small as to preclude the attainment of high speed should the experiments turn out a success. The dimensions selected, therefore, were 100 feet long, 9 feet beam, 3 feet draft and 44 tons displacement. It will be noted that the ratio of beam to length is unusually small—9 : 100, while 10 : 100 or 11 : 100 is the more usual practice for this class of boat.

To begin with, the boat was fitted with one single turbine and propeller. The result was disappointing, the chief trouble being due to cavitations in the propeller, resulting in excessive slip. This was verified by experiments in a tank of water subjected to vacuum. The appearance of the action of the propeller in the water was observed by looking through a slot in a disk, which was made to revolve in synchronism with the propeller under observation.

It was then considered necessary to make several changes. New engines were built in three sections, the steam expanding through them in series, each section driving an independent shaft, and each shaft three propellers. Very soon $32\frac{1}{4}$ knots were attained and eventually $34\frac{1}{2}$ knots at the naval review at Spithead in 1897. About 2300 indicated horse-power were developed. The boiler, a Yarrow type with small tubes, had 1100 square feet of heating surface and an evaporation of about 28 pounds of water per square foot heating surface at $34\frac{1}{2}$ knots speed. About 600 horse-power were developed per ton of machinery and 50 horse-power per ton of total weight of vessel in full equipment. These successes resulted in a contract with the British Admiralty for a torpedo boat destroyed named the "Viper." The dimensions were the same as the 30-knot destroyers of her class, 210 feet long, 21 feet beam, and 350 tons displacement. The engines consisted of two independent sets, each consisting of one high pressure turbine driving a shaft and one low pressure turbine driving its shaft. On the same shaft as this low pressure was permanently connected a small turbine for reversing purposes. When running ahead the reversing turbine was in connection with the condenser, so that the frictional losses due to this turbine running idle were very small. The same fact applies to the go-ahead turbines when running astern. There were, therefore, four propeller shafts, each fitted with two propellers, the one ahead having a slightly lesser pitch than the after ones.

The Yarrow type boilers have 15,000 square feet heating surface; grate surface, 272 square feet; condensers have 8000 square feet surface. The speed attained was 35 knots to begin with, and later 36.858 knots were reached.

It is generally conceded by engineers that but little more may be anticipated in the development of the reciprocating engine. Any improvement that we can imagine would not very materially improve its efficiency as a heat engine. On the other hand, the turbine is capable of development in many ways, particularly in the use of superheated steam to a degree hitherto prohibitive, so that the day may not be very far distant when the turbine will replace the reciprocating steam engine for most purposes.

A Board of Trade has been organized in Northampton, Mass., with Warren M. King as president and J. W. Hartwell as secretary.

Canadian News.

The New Furnace at Midland.

The Canada Iron Furnace Company, whose charcoal iron furnaces at Radnor Forges, Quebec, trace their antecedents back over 200 years to the days of the French régime, formally opened their new smelter at Midland, Ontario, on the 19th inst. A considerable number of persons from various points in Ontario and Quebec, who as manufacturers or otherwise are interested in the iron industry, assembled at Toronto upon the invitation of the company and were taken in a special train to Midland. Among the guests were the Premier of Ontario and the Commissioner of Crown Lands. The furnace had been in blast nearly a fortnight, but was restricted to a very limited daily output up to the day of the inauguration. The "christening" was done by the Premier and the tapping by the Mayor of the town.

This will be the first furnace in Ontario to run on almost exclusively Ontario ore. As shown by the last annual report of the Bureau of Mines, the other two furnaces in the province drew 78 per cent. of their ore from the United States. It is expected that 95 per cent. of the ore treated in the Midland smelter will be of domestic production. The Ontario ore comes from the Helen mine, and a quantity, said to be 60,000 tons, lies at the furnace, having been delivered there by the steamships of Mr. Clergue's line. Mr. Clergue is a director of the Canada Iron Furnace Company. The other directors of the company are P. H. Griffin and Hon. T. Guilford Smith, Buffalo; Geo. E. Drummond, Thomas J. Drummond, James T. McCall and A. F. Gault, Montreal; Geo. Gudewill, New York; E. V. Douglas, Philadelphia. It is but recently that Mr. Clergue and Mr. Douglas joined the board.

When the idea of building the furnace was first projected it was the intention of the company to make charcoal iron. That purpose has since been given up and coke iron is the product. A reason assigned for the change in plan is that the persons in control of the timber lands from which the company expected to get their fuel took advantage of the new industry to raise the price. There is an abundance of suitable wood about Midland, but it stands on land under license to lumbermen. Though these have really no market for the small stuff, they appear to have united to raise the price above what the company deemed it profitable to pay, so it was decided to use coke.

The works were planned by John J. Drummond and are pronounced by competent judges to be very complete, much superior to the general run of blast furnaces.

The capital stock of the company is \$500,000, paid up, with \$200,000 of 5 per cent. 20-year gold bonds. Their properties embrace the new furnace at Radnor Forges, Quebec, with timber limits, water powers, limestone quarries and 100,000 acres of bog ore lands in that province. Drummond, McCall & Co., Montreal, are the sole agents, and they have the benefit of connection with the car wheel shops at Hamilton and St. Thomas in Ontario and at Lachine in Quebec, besides being largely interested in the manufacture of cast iron gas and water pipes at Lachine and Londonderry, N. S.

In the agreement with the town the company's privileges are to receive a municipal subsidy of \$50,000 and to have their assessment for municipal taxation limited to \$25,000. Their obligations are to spend \$250,000 on a furnace and works, to turn out 60 tons of iron daily, to work 300 days per annum for ten years, to employ 70 men.

Expansion of the Dominion Steel Company.

The Dominion Iron & Steel Company have decided upon the departure of which some foreshadowing was given in this correspondence a fortnight ago—namely, to begin at once the erection of a plate and rail mill in connection with their other works at Sydney, Cape Breton. At a meeting in Montreal on the 14th inst. this course was determined upon, and a resolution was passed authorizing the issue of \$5,000,000 additional capital stock to provide for the change. A strong syndicate has been formed to underwrite the issue. To the existing share-

holders the right is reserved to take one share of new stock for every three of old stock held by them. This they are to have at syndicate prices. It is expected that the manufacture of plates and rails will be begun within a year. The statement is made that large orders have already been given, and should no strikes or other checks intervene a good part of the machinery will be installed by next October.

Before coming to this resolution the Dominion Iron & Steel Company doubtless had certain assurances that there would be a profitable demand for the new products they mean to turn out. They are believed to be in touch with the promoters of the enterprise for building steel vessels at St. John and, perhaps, Halifax. Certainly the provincial governments concerned have been approached in respect to these shipbuilding propositions, and these are expected to figure prominently in the business before the New Brunswick and Nova Scotia legislatures next session. There is a supposition that the powerful influence of the Dominion Iron & Steel Company and the Dominion Coal Company are behind the scheme and will be exerted to get a subsidy probably from the Dominion Government, as well as assistance from the Nova Scotia and New Brunswick governments. It is very possible that Mr. Whitney knows pretty well the disposition of all these governments toward the shipbuilding projects and so feels warranted in launching out into the manufacture of plates.

As to the manufacture of steel rails as well, some government favor would probably be bespoken. At present steel rails are on the free list. The Dominion Iron & Steel Company would naturally prefer a duty on them and have, perhaps, made their views known to the Government upon that point.

The Iron Pipe Trade.

Canadian manufacturers of iron tubing have resorted to an ingenious way of defending themselves against American competition. Iron pipe prices were quoted by American sellers in this market much below the figures current in New York. Exports to Canada became heavy and continued so for some time, but the Canadian pipe works did not cease to be busy. On the contrary, it is claimed, they were making more money than ever. It seems they met the situation and kept the home market from becoming congested by the simple expedient of re-exporting the American pipe, which they bought up as offered, at a sacrifice. They were enabled to do this by the clause in the tariff law which provides that 99 per cent. of the duty shall be refunded on the exported product of imported raw material. All the manufacturing to which the American pipe was subjected in Canadian works was the cutting off of the original thread and the putting on instead of the British thread. This, the customs authorities said, would be technically sufficient to earn the rebate. The pipe was sold in England at a snug profit, because in that market American competition was not carried on at a sacrifice. At the same time this market was preserved for Canadian manufacturers.

Minor Notes.

The Canadian Bridge Company, Walkerville, Ont., have applied for incorporation. The capital stock is \$250,000; the provisional directors are B. S. Colburn, F. C. McMath and G. F. Porter of Detroit.

Boiler plate for the 20 Government locomotives the Kingston works are to build has been contracted for at Pittsburgh.

At the annual meeting of the Montreal Metal and Hardware Manufacturers' Association, held some days ago, the following officers were elected: President, W. W. Near; vice-president, James Davidson; treasurer, J. C. McCormick; other directors, Geo. Cauerhill, F. H. Hopkins, James W. Pike and W. S. Leslie. G. E. Drummond was chosen as the association's representative for election to Council of the Board of Trade.

The Coldbrook Rolling Mill, near St. John, N. B., was destroyed by fire on the 19th inst. The plant and buildings were valued at \$75,000; stock on hand at \$40,000. The property was not fully insured. The works were constructed 40 years ago, but were re-equipped during the last five years.

A by-law is to be submitted to the rate payers of Kingston on January 7 to authorize a change in the agreement with the blast furnace promoters. The change is not a very material one, but is said to be necessary for the securing of capital.

F. H. Clergue stated before he left for Europe last week that 100 carloads of material for his Bessemer steel plant were on the way to the Sault. He expects to begin manufacturing next summer.

J. H. Douglas, hardware appraiser at Montreal, has been granted six months' leave of absence for the benefit of his health. Gustave Pech has been appointed to the hardware appraiser's branch at Montreal.

Application has been made by one of Mr. Clergue's companies for space in the harbor at Montreal for the construction of an ore dock.

In an interview published in the Montreal *Herald* Graham Fraser is represented as saying that during the last year the Nova Scotia Steel Company used at their Ferrona Furnace 40,000 tons of Belle Isle ore and shipped 150,000 tons to the United States.

For about a week the core makers, 50 in number, were on strike at the works of the Malleable Iron Company, Oshawa, Ont. Their action seemed likely to bring about a stoppage of the works and throw 150 other employees out of work, when the new Department of Labor at Ottawa was induced to mediate. The Deputy Minister of Labor arrived, harmony was restored and the men went back to work.

C. A. C. J.

The York Agricultural Trade

The manufacturers of agricultural implements in York, Pa., advise us that there has been some falling off in the domestic trade in agricultural implements. This has probably been caused by the increase in prices of materials and also by the lower prices which were obtained by farmers for their crops, and again by the reported failure of crops in some sections of the country. Foreign trade, however, has largely increased, and numbers of implements have been exported. This trade has been much better than it was last year, and with some manufacturers has increased as much as 75 to 100 per cent. The outlook, however, at present is favorable for increased foreign and domestic trade, and a largely increased home trade is expected during the present season.

The A. B. Farquhar Company, Limited, report that their engine, boiler and saw mill trade is exceptionally good. Shipments abroad as well as for the home trade have been heavy. A number of saw mill outfits have recently been shipped to the Philippine Islands. The agricultural implement and threshing machine business has not been equal to last year. This is probably accounted for because of lower prices of grains and of crop failures in some sections. The plow trade with the Farquhar Company was dull for a time, but has fully recovered, and this department is now exceptionally busy; one order alone for 1500 plows was recently taken for export.

Hench & Drongold, manufacturers of agricultural implements, York, Pa., have experienced a heavily increased foreign trade, while the home trade has not developed any marked progress. Owing to the crop conditions and prices, the home trade has not been as active as in 1898-1899, but the conditions for better trade are good, and this season promises to be a good one.

A New Mill at Youngstown.—The Youngstown Iron & Steel Roofing Company, Youngstown, Ohio, who are large buyers of black and galvanized sheets in the open market, have decided to erect a sheet mill and galvanizing plant in close proximity to their present works at Haselton, a suburb of Youngstown. The new mill will be under the absolute control of the Youngstown Iron & Steel Roofing Company. The product will be black and galvanized sheets, and will be used by that concern in the manufacture of the following products: Iron and steel roofing, T and C metal lath, Youngstown corrugated expanded metal lath, Buckeye metal trough flooring for bridges and fire proof flooring for buildings. The plant will consist of four hot mills, one cold mill and the puddle

mill. It will be equipped with all modern machinery, and it is intended to make it one of the most complete sheet plants in the country. The cost is estimated at \$150,000, and in order to provide funds for the building of the new mill the capital stock of the Youngstown Iron & Steel Roofing Company is to be increased from \$25,000 to \$250,000. An identified interest of the Youngstown Iron & Steel Roofing Company is the Youngstown Range & Stove Company, and a part of the product of the new plant will be used by that concern in the manufacture of their ranges, for which they are having a very large demand. The initial plant of the Youngstown Iron & Steel Roofing Company was established in Youngstown some years ago, but has been steadily enlarged to meet the demands of their rapidly growing business. The officials of the concern are L. E. Cochran, president; C. M. McKelvey, vice-president; Mason Evans, secretary and treasurer, and John O. Pew, general manager. Much of the success of these concerns has been due to the efficient management of Mr. Pew, who has been connected with both since their inception.

The Crane Company and Their Employees.

The Crane Company of Chicago have just furnished splendid and substantial evidence of appreciation of the services of their employees which is of a sort seldom offered by corporations. The company have declared a dividend of \$1,000,000, or 25 per cent., on their capitalization of \$4,000,000, but of greater public interest and of vast meaning to those who are seeking a solution of the differences between capital and labor is the announcement that every employee of the Crane Company will receive a dividend of 5 per cent. on his earnings during the past year. For instance, the employee whose salary is \$1000 will receive \$50 as his share.

Nearly \$100,000 will be divided among the employees of the following plants in Chicago and branch houses in other cities: 10 South Jefferson street, at Desplaines and Fulton streets, at Twelfth place and Canal street, at 219 South Jefferson street, Chicago; at San Francisco, Sioux City, St. Louis, Omaha, New York, Cincinnati, Los Angeles, Philadelphia, Portland, Ore.; Kansas City and St. Paul.

Richard T. Crane, president of the Crane Company, originated the plan and carried it through. The payments to employees will be made before January 1, when the big dividend is payable. Mr. Crane believed that the splendid profits were largely due to the loyalty and energy of the men, and when he proposed the division the other stockholders were quite as enthusiastic. Mr. Crane's generosity has been shown on many occasions. He is a great advocate of manual training in public schools, and six years ago he provided an ample fund for equipment for manual training in the grammar grades of Tilden School, Chicago. Splendid results followed, encouraging Mr. Crane to continue the work.

The great business of the Crane Company was started in a very small way. In 1855 Mr. Crane opened a small brass foundry in a lumber yard belonging to his uncle, Martin Ryerson. Later he was joined by his brother, Charles S. Crane, and the business in 1865 was moved to larger quarters in Lake street. The story from that time is one of expansion and profits. The company are manufacturers of wrought pipe, but are especially known as the largest manufacturers of fittings and other supplies for gas, steam and hot water service. They manufacture more than 7000 different articles.

The main offices of the company are at 10 North Jefferson street, Chicago, and the officers are: Richard T. Crane, president; C. R. Crane, first vice-president; R. T. Crane, Jr., second vice-president; J. B. Murphy, secretary and A. F. Gates, treasurer.

More than 3500 men and boys are employed in the various factories and branches.

When interviewed in regard to the company's method of sharing profits with their workmen, President Crane said:

"Some time ago, when we were considering the results of our year's business, it occurred to me that inasmuch as we had enjoyed great prosperity it would be no more than a just act to share our profits with the men, who,

by their labor, made it possible for our business to thrive. The officials of the company were consulted and we decided to set aside \$100,000, to be distributed among our employees. Two years ago we divided a like amount between the heads of departments and foremen. This year we included every one on the pay roll, from the office boy up.

"I think this is a plan which other employers of labor could follow with pleasing results. There is no question but it brings the employee into closer touch with his employer, and I believe stimulates good feeling all around. On the other hand, it seems to me that the men who by the sweat of their brow build up a business and help to increase profits are entitled to a portion of the results of their labor.

"Some years ago we tried the co-operative plan of conducting our business, but found it to be unsatisfactory, for the reason that petty jealousies cropped out among employees and general results did not justify us in continuing along this line. The plan of voluntarily sharing profits at the close of a year's business does away with these objections to the so-called co-operative system and places the employee under no obligations to his employer, and *vice versa*."

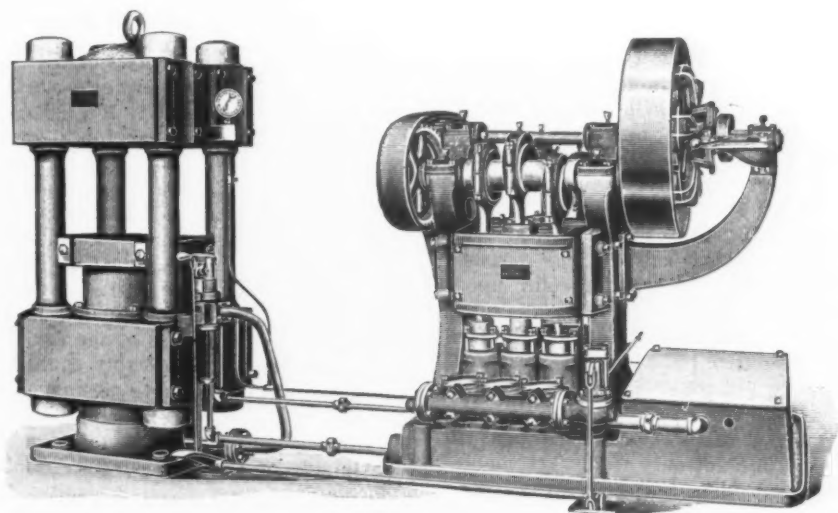
The Bessemer Road.—Robert A. Franks, treasurer of the Pittsburgh, Bessemer & Lake Erie Railroad, at Pitts-

The Waterbury Farrel Hydraulic Press and Compound Pump.

The hydraulic embossing press here shown is intended for working watch cases, coining large medals, hubbing dies, heading cartridge cases, or wherever a considerable pressure is to be applied slowly. The upright rods are of forged steel, finished all over. They pass through recesses in the platens, being held in place by caps, with enlarged ends bearing on the platens. The cylinder is of forged steel, copper lined, the lower platen forming the head, the water entering through it. The ram is cast iron, its top circular in plan but flattened off front and back. It is guided by the four uprights. A leather packing ring keeps the joint between the ram and cylinder tight. The platens are made of cast iron, the lower one resting on a base or foundation plate.

This press has a capacity of 750 tons, with a working pressure of 5950 pounds per square inch. The ram has a diameter of 18 inches and a maximum stroke of 6 inches. The top of the ram measures 22¼ inches front to back and 28 inches from side to side. From the top of the platen to the ram when down is 20 inches. The opening between the front rods is 23 inches and between the side rods 15½ inches. The press occupies a floor space 43 x 37 inches, the extreme height being 92 inches.

The compound power pump used with this press has



THE WATERBURY FARREL HYDRAULIC PRESS AND COMPOUND PUMP.

burgh, has sent circular letters to the stockholders which state that "the Board of Directors have authorized the issue of 10,000 shares of preferred stock of the company, which will be first offered to shareholders in proportion to their holdings of stock upon December 17, 1900, in the proportion of one-twenty-third of one share for each share of stock now outstanding. This privilege may be exercised at any time after December 17, 1900, and on or before January 16, 1901, after which any stock not taken by the stockholders will be sold at the discretion of the treasurer. If you desire to avail yourself of this privilege please send your check to the undersigned for the par value of the shares or fractional shares to which you are entitled, together with accrued interest at the rate of 6 per cent. from December 1, 1900, to the date of payment." At the office of the United States Trust Company, the New York transfer agents of the road, it was stated that the books had closed December 15 and would remain closed until January 17 next, and, moreover, that the distribution of the preferred stock would be made to the holders of common stock as recorded at the close of business December 15. It therefore seems that all transactions made since that day would be ex-rights. The stock was offered at 29½ ex-rights yesterday on the local exchange.

A company have been organized at Trondhjem, Sweden, with a capital of 75,000 kroner, to operate the coal mines of Spitzbergen.

an automatic by-pass valve. There are two steel crank shafts geared three to one to the main shaft, cut gears well guarded being used. The base of the pump forms a tank, all parts of which are very accessible for cleaning. There are three low pressure plungers, 4 inches in diameter, and three high pressure plungers, ¾ inch diameter, all with 5 inches stroke. The low pressure side will deliver 12,000 cubic inches per minute against 300 pounds per square inch pressure, the high pressure side 575 cubic inches against 8000 pounds. The friction clutch pulley is 36 inches diameter, 9 inches face, and runs 200 revolutions a minute. This press is built by the Waterbury Farrel Foundry & Machine Company of Waterbury, Conn.

The American Bridge Company are very full of work. They have lately taken a contract for three large viaducts on the C. B. & Q. R. R. and also are building a 300-foot draw span for the same company. The Rock Island Railroad has also placed a contract for 3500 tons of material to be delivered during 1901. Among other large contracts being noted is the Highway Bridge at 145th street, New York; two large viaducts for the Oregon Short Line; 25 highway bridges in Kansas; the structural steel work for the new 14-inch continuous mill for the Carnegie Steel Company at Duquesne Steel Works; the structural steel work for the new armory at Medina, N. Y., and a large steel building to be used as a blacksmith shop for the A. T. & S. F. Railroad Company at Topeka, Kansas.

The Ship Subsidy Bill.

The Outlook for the Measure.

WASHINGTON, D. C., December 24, 1900.—The Senate adjourned for the holiday recess on the 21st inst., with the ship subsidy bill still occupying the position of unfinished business, and apparently no nearer a vote than when the session opened. Although technically before the Senate throughout the month, the bill has really received consideration during a few days only, the greater part of the time having been occupied in executive sessions on the Hay-Pauncefote canal treaty, and in the consideration of routine matters in open session.

The serious work of the short session will begin immediately upon reconvening on January 3, and the friends of the ship subsidy proposition will then take the measure up with the determination of putting it through within 30 days, if that is a possibility. The opponents of the pending bill, while disclaiming any intention to filibuster, are equally emphatic in declaring their intention to defeat the bill by legitimate tactics. It is conceded here that the outlook for the ultimate passage of the measure has become less promising during the past ten days. This fact is due to the large number of individual amendments which have been brought forward by Senators, who, while expressing an intention to vote for the bill, insist that it shall be modified in certain important particulars. Many of these amendments are contradictory and very few can be incorporated in a harmonious bill that would stand any chance of acceptance by the House. The disintegration of the support of the bill has become so alarming to the friends of the measure within the past few days that an intimation has been sent out by influential members of the Commerce Committee to all Senators favorable to a subsidy bill that a conference of some kind must be held prior to the reconvening of the Senate for the purpose of harmonizing conflicting demands and agreeing upon the terms of a bill that can be passed. Whether the managers of the bill will go so far as to make it a caucus measure or not cannot be stated, but the steps necessary to bring the friends of the bill together will be speedily taken.

The present unpromising outlook for the passage of the bill at this season is due not only to disagreements among those who favor subsidies, but also to the agitation of various subsidy propositions by those seeking to defeat the measure. Members of the minority in the Senate have temporarily laid aside the free ship subsidy and are now proposing an export bounty on agricultural products. These Senators contend that the enactment of a subsidy law along the lines of the pending measure, instead of reducing freight rates, would actually result in an increase, which "means a corresponding loss to the farmers of the nation on all the corn, cotton, wheat, hops, tobacco, meat products, and on all other agricultural staples, whether these are to be exported or whether sold for use in the home market." It is maintained that with power to raise and lower ocean freight rates the American ship owners would be able to "raise and lower the home price of several billion dollars' worth of agricultural staples at any and all times." In a memorial filed by Senator Butler of North Carolina the following reference is made to the position of the ship owners and shipbuilders:

"There is yet one more consideration which the merits of the case deserve to have brought forward. We find that the ship owners are working with great zeal for the adoption of their measure, urging its passage on the score of its utility to this nation. But we believe that there is just ground for doubting their sincerity in the matter. Decidedly so, if we are to judge from their former statements. By referring to the Philadelphia papers of July 31, 1895, it will be seen that at a convention in that city, at which almost all the Atlantic Coast ship owners and shipbuilders were present, they unanimously passed resolutions condemning the protection of shipping at the expense of agriculture. Their chief spokesman, Charles H. Cramp, then said that shipping should only be protected when in the same bill

there should likewise be provided protection for the staples of agriculture. Accordingly, there was a resolution passed unanimously for the joint protection of shipping and of agricultural staples by a bounty on exports.

"Realizing the inequality and the economic unsoundness of protecting shipping at the expense of agriculture, Mr. Cramp then said: 'When we went to Congress, and asked a bounty for ourselves, we committed a grave error, and I am going to do all I can to repair it.' These remarks were applauded to the echo, and yet we find that in the face of all this the shipping men are now striving with all zeal and vehemence to do just what they previously condemned as an injustice and an economic wrong."

Export Bounties, and Discriminatory Tonnage Dues.

Senator Frye, chairman of the Commerce Committee, analyzes the proposed plan of paying export bounties or imposing discriminatory tonnage dues in the following statement:

"The proposition to impose discriminating duties on the tonnage or cargoes of foreign vessels is in conflict with nearly all our commercial treaties. It involves radical changes in our trade relations with the world, which in the main are now quite satisfactory. It requires indefinite delay and the certainty of retaliatory measures. In any form in which it can be presented it necessitates considerable changes in the relative rates of duties of the present tariff law, which was carefully prepared and has operated to the general satisfaction of the country.

"The proposition to pay bounties on exports is not feasible, for by our treaties we are bound to pay the same bounties on exports in foreign as in American vessels. The objections to the repeal of our treaties have just been considered, and they are sufficient to render impracticable any proposition on such repeal. In certain quarters it has been urged that it is immaterial whether our exports are carried in American or in foreign vessels, and the committee has been asked to turn aside from the very problem set before it—the restoration of our merchant marine—and to recommend the payment of bounties on exports regardless of the nationality of the ship. Legislative ingenuity probably could not devise a project which would do more to fasten for an indefinite time the hold of foreign shipping on our commerce than this export bounty proposition.

"Outside of the considerable number of those who advocated the proposition without a full knowledge of our treaty obligations, and who have since abandoned it when confronted with those objections, this project finds its support only among the owners of foreign vessels, present or prospective, who from this source look for a material increase in the volume of their freight receipts. Even assuming it were constitutional, which is a matter of grave doubt, the agricultural export bounty proposition would call for the payment of from \$12,000,000 to \$15,000,000 annually to foreign vessels carrying our exports to Europe, in return for which expenditure the committee has been able to see absolutely no prospect of advantage to our national interests.

"Our exports of agricultural products for 1898, expressed in terms of weight, amounted to 16,505,971 tons of 2240 pounds each. Assuming that the remaining 5 per cent. in value not expressed in weight was of relatively the same weight, our exports of agricultural products for 1898 amounted to 17,200,000 tons. Our exports, other than agricultural products, expressed in terms of weight, amounted to 9,270,223 tons of 2240 pounds. These constituted 43 per cent. in value of our exports, excluding agricultural products. The remaining 57 per cent., valued at \$203,208,125, chiefly products of skilled manufacture, did not weigh to exceed 2,000,000 tons, making the total weight of our exports, excluding agricultural products, 11,300,000 tons. Including 17,200,000 tons of agricultural products, the weight of our exports for 1898 amounted to 28,500,000 tons of 2240 pounds.

"The proposition to pay \$1 a ton on agricultural exports would thus involve an annual expenditure of \$17,200,000, on the basis of 1898, and if applied to all exports (in order to be constitutional) would involve an expenditure of fully \$25,000,000. This heavy charge on our revenues would insure no increase in our shipping facilities.

ties, offer no certainty of reduced freight rates, and would in effect be a contribution of that amount to the sum of \$160,000,000, or thereabouts, which we already pay to foreign nations."

A faction in both houses that must be reckoned with in this connection is opposing the subsidy bill on the ground that it is unnecessary legislation, and that the claims of its friends as to the present situation of the American shipbuilder are too greatly exaggerated. It is pointed out that the lake shipbuilding interests, which were recently brought into line for the bill, are now again opposing it on the ground that it will not be of any benefit to the shipbuilding industry, and are furnishing evidence to show that the disparity between the cost of construction in the United States and Great Britain is by no means as great as has been represented. In this connection Representative Chanler of New York, in a special report from the House Committee on the Merchant Marine, says:

"Charles H. Cramp of the great shipbuilding firm of Philadelphia has written an interesting communication stating that it costs from 15 to 25 per cent. more to build ships in this country than in Great Britain. If this is correct, then a very substantial inequality is presented between the cost of ships built in the United States and in Great Britain, but these conclusions are controverted by many persons who claim familiarity with the conditions.

"The other members of the minority claim to have successfully established their contention that ships may be built as cheaply here as elsewhere. It may be said upon this question that under existing law all articles which enter into the construction of ships are admitted free of duty, so that our shipbuilders are free to buy in any market all necessary material. As against this element of cost it is contended by the majority that higher wages are paid to American workmen, thus creating an inequality in cost of construction, but, on the other hand, it is contended that this higher rate of wages is counterbalanced by the greater efficiency of our workmen and improved machinery at their disposal. As to the cost of operating American ships and referring only to the wages of seamen, it is probably true that these wages are higher as to such seamen as are shipped in our own ports for the foreign trade and to engage in the coastwise and lake trade. But under section 20 of the act of June 26, 1884, American vessels are permitted to ship seamen in foreign ports for the round trip, which enables them to avoid the payment of American wages."

The effort to be made by the friends of the subsidy proposition to unite on a satisfactory bill will be made the more strenuous for the reason that unless a solid front can be presented the managers of the Nicaragua Canal bill will be likely to bring it forward and contest for the position now occupied by the subsidy bill. At the beginning of the session there was an excellent prospect that both these important measures would be passed before final adjournment, but it is now conceded that only the most careful management can prevent defeat of one or both.

W. L. C.

§ The Uganda Bridge Contract.

In reference to the contract for the 34 bridges for the Uganda Railway, taken by the American Bridge Company, the *Engineer* says:

We are now in a position to say that this statement is substantially correct, though the amount of steel and the price to be paid are not as quoted. The actual amount of steel work is about 7000 tons, and the price paid about £135,000, or at the rate of just over £19 per ton. On Tuesday last, in the House of Commons, the question was put by Sir A. Hickman to the Secretary for the Colonies, whether he was aware that orders involving expenditures of many thousands of pounds for bridges for the Uganda Railway had been given to an American firm, and whether he would take steps to prevent such orders from being given in future without full opportunity being afforded to bridge builders in the United Kingdom to compete on the same conditions as regards tests, modes of manufacture, inspection, and erection at makers' works, as the American workers

were subject to? Viscount Cranborne replied: The answer to the first paragraph is "yes. With regard to the second paragraph, tenders were invited in the United Kingdom on drawings and specifications prepared by Sir A. Rendel, the consulting engineer, under the same conditions as regards tests, &c. One of the American tenders was found to be considerably the lowest in every respect, and was therefore accepted. British firms are always given full opportunity to tender for work for this line, and I need not say that Her Majesty's Government are anxious to employ them whenever the terms offered are consistent with the interest of the public service." We may add that we have it on excellent authority that the nearest British offer as regards delivery was to do the work in considerably more than double the time. In reply to further questions by Sir A. Hickman as to whether a principal bridge maker in this country never heard anything about these bridges until the orders were given out, and whether the American bridge maker had to put the bridge together at his own works before sending it away; and by Sir H. Vincent as to whether British makers were invited to tender before Americans, or whether both were invited simultaneously, Lord Cranborne requested that notice might be given of these questions. We are likely, therefore, to hear more of this matter shortly.

Central Pennsylvania News.

HARRISBURG, PA., December 24, 1900.—Many of the manufacturing plants gave their employees notice of a Christmas holiday, but the orders are so pressing in many instances that the respite from work will be short. There is one exception, a notice having been posted at the mills of the Lalance-Grosjean Tin Plate Company that operations would be suspended from Saturday night last until January 7. Meanwhile certain changes will be made, and it is possible work may be resumed sooner. John P. Luce has taken charge as general manager, succeeding E. Stanford, who has leased the Plymouth Rolling Mills at Conshohocken. He will manufacture muck bars, sheet steel and tin plate. These mills have been idle almost a year. Mr. Stanford was considering the establishing of a tin plate plant here, but will take the Plymouth mills instead. His son, George, has already gone to Conshohocken to get ready for the starting of the plant.

A new system of paying their employees has been inaugurated by the Pennsylvania Steel Company. It involves an entire change of the system of bookkeeping, but will enable the company to pay the different departments at different times and avoid the crush of one pay day for all employees. It is not easy to distribute the wages of such an army of men under the old system. J. N. Gunn of New York, an expert accountant, is introducing the system, and it will be several weeks before the change shall have gone into effect in every part of the great plant.

There is considerable gossip here of the increase of the capital stock of the Pennsylvania Steel Company. It has been felt for years that the working capital of the company was entirely too small for their operations and increasing business, and while the officials are reticent as to the financing plan, the sum of \$15,000,000 is mentioned as the probable total when the plan shall have been finally agreed upon. It is said to be almost certain that the Cuban ore properties owned by interests identified with the Pennsylvania Steel Company will be included in the new deal. These properties are regarded as very valuable. The construction of the steel pier near Santiago is now under way, and the railroad to the mines will give the opportunity to develop the ore deposits, which are believed to be large. The present capital of the company is \$6,500,000.

The mills in the South Harrisburg district are all busy and the outlook for the opening of the year is all that any manufacturer could desire. Business seems to be upon a firm foundation.

S.

The census returns show that Berlin, Germany, has a population of 1,884,345, as compared with 1,677,304 in 1895.

The Iron Age

New York, Thursday, December 27, 1900.

DAVID WILLIAMS COMPANY,	- - - - -	PUBLISHERS.
CHARLES KIRCHHOFF,	- - - - -	EDITOR.
GEO. W. COPE,	- - - - -	ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS,	- - - - -	HARDWARE EDITOR.
JOHN S. KING,	- - - - -	BUSINESS MANAGER.

The Consolidation Supplement.

We forward this week to the subscribers of *The Iron Age* a special Supplement entitled "The Consolidations and Listed Stock Companies in the Iron and Allied Trades." As its title indicates, it covers a wider field than did the first, issued in February. We have received so much evidence of the usefulness of that first effort that we feel convinced that the present edition will meet with much appreciation. It contains a vast amount of information, handy for reference, about 45 companies, and for convenience sake is accompanied by an elaborate index showing to which particular consolidation each of the older constituent companies belongs.

The Progress of a Century.

The end of the century, now near at hand, gives occasion for the publication of much literature reviewing the progress of the past hundred years in the arts and sciences, and for comparison between the conditions of living in 1800 and at the present time. These comparisons cannot fail to be interesting and instructive. Pretty much all our knowledge of applied science, of chemistry and of the mechanic arts has been learned within that period, or if not learned, at least usefully applied. It seems incredible that another century can show a progress so marked and striking, for the reason that there would seem to be fewer opportunities for the discovery of natural laws than were offered a hundred years ago, and fewer original vacancies to fill with useful inventions. An immense amount of work has been done during the past 50 years, the benefits of which will not be realized until some time in the twentieth century. Invention and discovery invariably run ahead of application, and those which are in the truest sense revolutionary are often so far ahead of the immediate needs of commerce and industry that they are absorbed into the sum of knowledge by one generation and utilized by the next generation or by one still more remote. This is strikingly illustrated in the case of the work of the early experimenters with electricity. Two or three generations later their labor gained its first practical importance, and the names of Volta, Ampere, Ohm and others who wrested from nature the secrets which are the basis of modern electrical science are remembered chiefly because crystallized in its nomenclature. A large part of the investigations of the past 25 years are like units of energy accumulated in a storage battery, presently inoperative, but available for use when the conditions are such as to demand their practical employment.

That science should precede art so far that they sometimes lose sight of one another is not surprising. The mechanic is naturally a conservative. His skill, gained in practice, looks backward to the standards of the past. He changes his methods and differentiates his product reluctantly, and as a rule only when forced to do so by insistent business considerations. He must be conservative to protect his property in plant and appliances, as well as to protect his experience, which is an asset of steadily diminishing value. The arts cannot follow close

upon the heels of science. If they did science would take the bit in its teeth and bolt into the realm of the fourth dimension of space. The true investigator is like Daniel Boone, who is said to have shouldered his rifle and started westward when a settlement within 20 miles of his camp convinced him that the "neighborhood was becoming too crowded." But for the reason that civilization follows the pioneer, more or less slowly as circumstances may necessitate, and towns are ultimately planted where the camper found conditions favorable, the arts follow the sciences as rapidly as is necessary or desirable. Thus it happens that much of the original work of the nineteenth century will find its application during the twentieth century; and in estimating the results of a hundred years of progress we must not fail to recognize the fact that behind the dam which represents the limitation of profitable business enterprise the nineteenth century has impounded a vast amount of knowledge which will accelerate the wheels of industry as fast as it can pass through the head-race—an operation likely to occupy a good part of the twentieth century.

If asked to say what we consider the distinguishing feature of the nineteenth century, we should unhesitatingly answer—popular education. In this is found a comprehensive explanation of the progress which has effected a higher and more uniform development of civilization than was reached through the eighteen centuries preceding it. There has never been a time since the beginning of authenticated history when the world has lacked great philosophers or profound thinkers. They towered as miracles of genius above the low level of ignorance and superstition, contributing little to contemporaneous progress and leaving behind them monuments as marvelous, and almost as useless, as the Egyptian pyramids.

During the present century the elevating influence of education has for the first time reached the masses of the people. The result has been a great leveling up of the human race, permitting the application of knowledge to the betterment of the conditions of every grade of society. But for this the progress of the arts, in which we often mistake effect for cause, would have been impossible. If labor had not been prepared by education to profit by emancipation from the drudgery of work better done by tireless arms of iron and fingers of steel, the introduction of labor saving machinery would have been resisted by revolution. If education had not improved the capacity of the classes which practice handicrafts, and prepared them for higher functions, demanding intelligence, the processes which have given us labor saving machinery would have been impossible. Popular education created demands for more comfortable conditions than satisfied the masses of the people a century ago, and in meeting this demand the great developments which have made distance a geographical term and given us facilities for intercommunication which anticipate time have been mere incidents, important only when measured by their practical utility.

In this, as in other things, the full value of the work of the nineteenth century will not be realized until the twentieth century is well advanced. Education is accumulative. The child of intelligent and well informed parents has a greater capacity for education than its parents had, and in a given time can learn more with less mental effort. Free schools and the compulsory attendance of children are eliminating ignorance as a brake on the wheels of progress, and each succeeding generation will occupy a higher plane of general intelligence, with larger and more varied wants and a greater capacity for effective co-operation with those who lead the world's progress.

The nations which are standing still or retrograding

are those which have neglected popular education. Their products are of small account in the statistics of international trade; their markets call for little except the bare necessities of life. They are neither feared nor respected, and their fate is decided by diplomatic correspondence between the powers. Their classification is "semi-barbarous," and as nations they have no rights which other nations are bound to respect. Popular education changes all these conditions, and nothing else can or will. The growth and development of this country is due in larger degree to our common school system than to any other cause. We have assimilated, refined and fitted for citizenship the children of the immigrants who have been attracted by cheap land and abundant food. This element of our population could have been Americanized by no other agency, and had this been lacking very little of the industrial development which has amazed the old world would have been possible.

Checking Gold Export.

A House bill has been favorably reported by the Senate Finance Committee which recalls the petty and ineffective efforts Congress has made to discourage gold exports. In 1882 Congress authorized the Treasury to supply gold bars in exchange for coin. The idea was that the Government might as well save the cost of minting gold that was to be exported. Gold bars are really more desirable for export than coin because they are more easily handled and there is no loss from abrasion. Under this law gold bars were freely used for export.

But it troubled gentlemen in Congress that the Treasury should facilitate gold exports, as they imagined, by supplying at par gold in the best shape for export, so in 1891 the Secretary was authorized to make a charge for the bars. He has made a charge calculated to meet the cost of manufacturing the bars, 4 cents on \$100. But the Government furnishes coin without any charge for mintage, and it has been complained that the effect of charging for bars has been to encourage the export of coin, the cost of striking which was a waste of public funds. The bill now reported to the Senate proposes to leave the Secretary free to make a charge or not, according to his judgment at the time of what is for the interest of the Government.

Why, it is frequently asked in Congress and out, should the United States furnish coin without charge for coining for export when the Bank of England and France and Germany have means of discouraging the export of gold? The answer is to be found in the currency system of the Civil War, perpetuated to this day. The United States keeps afloat a large volume of legal tender paper; this must be redeemed on demand in gold or else depreciate. But if it is redeemable on demand for gold, the note holders can obtain gold for export or hoarding at any time and without charge, for if any charge were made it would be a depreciation of the notes. In England and France the notes are issued by banks; they check the exports of gold, not by raising the price of gold, though there are narrow fluctuations in the price of gold at the Bank of England, and the Bank of France makes a small charge for supplying gold for export, as it may redeem its notes in gold or silver; these banks check gold exports by raising the discount rate, which the Treasury cannot do because it is not a bank and does no discounting.

When we owe money abroad, or when money commands a higher price abroad than here, gold must go abroad, and there is no charge that can be made upon gold that will defeat this movement. The Treasury does

no banking business, a charge on coin would be a discount on currency, and a charge on bars merely turns the demand toward coin. In exporting coin we lose the cost of minting, and much of the coin being somewhat under weight there is a loss of exchange. When the legal tender notes shall be retired the conditions in regard to gold exports will be virtually the same here and in Europe.

The Right of Employers to Discharge Workmen.

Considerable attention has of late been given to the manner in which labor organizations have succeeded in incorporating in the statutes of numerous States enactments intended to increase the privileges of workmen belonging to unions and to correspondingly restrict the rights of employers. The leaders of the labor organizations have not relied upon the power of their unions to secure advantages for them through the usual channels of union action, but have used their political power in framing legislation. The fact has been pointed out that much of this legislation, if not all of it, is of a character which brings it in the category of class legislation, and that consequently when the constitutionality of such enactments is brought into question the courts have usually nullified the legislation.

A case of this character has just come up in the State of Illinois. It appears that in 1893 the Legislature of Illinois passed an act entitled "An act to protect employees and guaranteeing their right to belong to labor organizations." The statute has been in force since that time without its constitutionality being challenged until this year. A contractor and builder was fined \$25 and costs on a charge of violating the statute, the complaint being brought by a carpenter. The carpenter had been employed by the contractor at a time when he was not affiliated with any organization. While in the contractor's employ the carpenter joined a local union and was discharged. In passing on the case, the Illinois Supreme Court recites that under the Constitution a man cannot be deprived of his life, liberty and the pursuit of happiness without due process of law; that the rights of liberty and property include the right to acquire property by labor and by contract; that if an owner cannot be deprived of property without due process of law he cannot be deprived of any of the attributes that are essential to his personal rights. The act of 1893, the Court declares, deprives an employer of the right to terminate a contract with an employee, but the Constitution accords him this right the same as it allows an employee to terminate his contract with his employer.

This decision seems to be in strict accordance with common sense, as well as with the ethics governing the relations of individuals. It is claimed by labor leaders that any man working for another has a right to quit his employment or to strike at any time he pleases. This is a man's privilege. If his right to do this is conceded, and it seems to be conceded by all authorities, then, on the other hand, an employer must have the right to discharge an employee for any reason whatever. His liberty of action in this matter cannot be interfered with, even if an attempt is made to do so by the Legislature. It is possible that in the course of time enough of the enactments which have been made in the interest of labor will be adjudicated to plainly define the limits beyond which legislation cannot go in building up class privileges.

During the present year 320 vessels of 494,000 tons have been built on the Clyde in Scotland. This output breaks all shipbuilding records.

PERSONAL.

Alfred L. Lovejoy, for the past seven years manager of the Boston branch of Pratt & Whitney Company, has resigned to accept the position of general sales manager and treasurer of the Becker-Brainard Milling Machine Company, Hyde Park, Mass., and will shortly after January 1, 1901, be located at the main office at the works. The name of his successor at the Pratt & Whitney Company's office in Boston has not yet been announced.

J. W. Holmes, manager of the United States Cast Iron Pipe & Foundry Company's plant at Bessemer, Ala., has resigned his position and will be succeeded January 1 by V. Ferguson of Columbus, Ohio.

E. E. Cline, formerly manager of the Canton Rolling Mill, Canton, Ohio, but later manager of the sheet mills of the American Sheet Steel Company, at Canal Dover, Ohio, has been appointed superintendent of the district of the American Sheet Steel Company, comprising the mills of the company in New Philadelphia, Canal Dover, Dennison, Dresden and Canton, Ohio.

Ferdinand W. Peck, Commissioner General of the United States to the Paris Exposition, arrived in New York on Saturday by the American liner "St. Louis." He was accompanied by Assistant Commissioner General Woodward and other members of his staff. Mr. Woodward had the misfortune to fall and break a leg during the voyage home.

H. L. Cooke, manager of the Aetna-Standard plant of the American Sheet Steel Company, at Bridgeport, Ohio, has been appointed one of the district managers of the company. N. V. F. Wilson, manager of the shipping and order department, succeeds Mr. Cooke as manager.

Jonathan Warner has been appointed general manager of the operating department of the American Sheet Steel Company, vice A. W. Brown, resigned. Mr. Warner was secretary and general manager of the Struthers Iron & Coal Company until the absorption of that concern into the sheet combination, since which time he has acted as assistant general manager of the American Sheet Steel Company's operating department.

The annual dinner of officials of the Carnegie Steel Company, to be held in the Hotel Schenley, in Pittsburgh, on January 9, will be the most elaborate of any yet given by that company. It is probable that Andrew Carnegie will attend.

The friends of Samuel Thomas of Catasauqua, Pa., will be delighted to learn that he has nearly recovered from his severe illness.

P. Thayer Wood of Youngstown, Ohio, has been appointed assistant superintendent of the steel mill at Ensley, Ala.

De Courcy May has been appointed general manager of the New York Ship Building Company of Philadelphia. He was general superintendent of the Dickson Mfg. Company of Scranton, Pa.

H. P. Richardson, superintendent of the Hartman Mfg. Company at Ellwood City, Pa., has resigned his position with that company to accept the position as secretary of the Lloyd Mfg. Company of Minneapolis, Minn. Mr. Richardson has been with this company 12 years and resigned the same week in which his predecessor, J. H. Hamilton, died.

W. C. Reilly, recently resigned as assistant district manager of Republic Iron & Steel Company, at Youngstown, is now auditor of the recently organized Youngstown Iron, Sheet & Tube Company.

D. W. Roper of the Buffalo Forge Company, who went to Europe last year for the purpose of superintending the installation of a number of heating and ventilating plants which the Buffalo company had sold in Europe, returned last Monday. The principal plant installed was at the works of the German Niles Company. Mr. Roper also made an extensive business tour of the Continent, which resulted in numerous orders.

D. H. Bacon, who has been president of the Minnesota Iron Company of Lake Superior for a good many years, has accepted the post of chairman of the board of Directors of the Tennessee Coal, Iron & Railroad Company, with headquarters at New York.

The Malleable Iron Trade in Eastern Pennsylvania.

During the past year the malleable iron trade has been fairly active, and the various shops have been running continuously. During the early part of the year prices of malleable castings ranged high, but declined with the falling prices of pig iron. October probably saw the lowest prices of the year, while at the present time the tendency is toward higher figures.

During the summer and early fall months there was some hesitancy on the part of purchasers to place the usual contracts. This was probably owing to the then approaching general election, and also may have been a holding for lower prices. These contracts have, however, all been placed. There are good inquiries in the market at this time, and no doubt the early part of the year will find considerable business placed.

The most notable addition to the malleable iron industry in this district is the plant of the Norway Iron & Steel Company at York, Pa. This plant is now practically completed and will no doubt be making castings before this is in print. Another new plant is that of the Huntingdon Malleable Iron Company, Huntingdon, Pa., which has been in operation since the early part of last year.

The Norway Iron & Steel Company, York, Pa., have a very well equipped modern malleable and small casting plant. Their foundry building is 246 x 80 feet, built of brick, with slate roof. The annealing house is 220 x 65 feet, also of brick. A two-story brick warehouse 140 x 40, machine shop, two-story brick office, engine house and supplementary buildings have all been completed. The capacity of the plant at present will be 25 tons of castings per day, which will be increased as necessity demands. A 10-ton open hearth furnace of special design has been built, and cupola and modern foundry equipment installed. In the annealing department four furnaces of special design have been erected. These have a capacity of 20 tons of castings each; also suitable cleaning and polishing apparatus put in. The machine shop has been equipped with the latest tools and the pattern shop exceptionally well supplied with wood working machinery. The mixing and melting of the mixtures will all be governed by chemical analysis, and we are advised that an exceptional quality of both malleable and steel castings will be produced.

The York Mfg. Company, York, Pa., have greatly increased their business during the year in both the malleable castings and ice making machinery departments. Their capacity in the former has been about 5 tons a day, but has been increased to 10 tons, and can be increased to 15 tons per day with the present equipments. A new 10-ton air furnace will be built in the near future and other alterations to buildings and flask yard made so as to obtain more floor space for molding. In the ice making machinery department considerable special machinery has been installed during the year, thereby facilitating the making of special parts of machines. The business of this department has increased 50 per cent. over that of last year, and the sizes of machines have been larger. Seventy-five machines have been built and shipped thus far during the present year. Inquiries are good, and the volume of business taken both for malleables and ice machines is quite satisfactory.

Otis, Bonnell & Co.—On January 1 the firm name of Otis, Hough & Co., dealers in pig iron and steel, Cuyahoga Building, Cleveland, will be changed to Otis, Bonnell & Co., William F. Bonnell, formerly of Youngstown and the Republic Iron & Steel Company, and F. A. Hough, formerly salesman for Otis, Hough & Co., having been admitted into the firm as partners.

Tin Plate and Merchant Pipe at Sharon.—The Sharon Steel Company, now building tin plate mills at Sharon, Pa., have decided to make it a 20-mill plant instead of ten mills. The Sharon Steel Company are also going into the making of skelp and pipe, and will build a large pipe mill west of the steel plant.

MANUFACTURING.

Iron and Steel.

It is reported that the Union Pacific Railroad Company contemplate the erection of blast furnaces on their property in Cheyenne, Wyo. The works will be close to the Wyoming iron fields, and it is claimed that the raw materials can be assembled at very low cost.

The Schuylkill Haven Iron Company, Schuylkill Haven, Pa., manufacturers of bar iron, will put their plant in operation early in January, after several months' idleness.

The La Belle Iron Works, Wheeling, W. Va., do not contemplate at this time the starting up of the Jefferson cut nail factory at Steubenville, Ohio, as the concern have ample capacity at their Wheeling plant to turn out all the nails they can sell, and they do not expect to increase their sales in the near future to such an extent as to make it necessary to start up more machines.

It is expected that ground will be broken before long for a new plant to be erected at Neville Island, Pittsburgh, by the American Iron & Steel Mfg. Company of Lebanon, Pa. It is stated the new plant will be built out of earnings of the company.

Sharon Furnace of the National Steel Company, at Sharon, Pa., was blown in on Wednesday, December 19. About 125 employees were put to work. The furnace is expected to turn out about 300 tons of Bessemer iron per day. It has been relined and put in first-class condition.

Jones & Laughlins, Limited, Pittsburgh, have almost completed the changes in their bar mill, and the installation of reels and other equipment, by which they will be able to furnish wire rods to the trade. They expect to be in the market with rods shortly after the first of the year. The third new Eliza Furnace of this concern at Pittsburgh is about completed, and will be started early in January. The fourth stack, now under erection, will not be completed before April or May, or perhaps later. These furnaces are among the largest ever built, containing all the latest improvements, and are expected to turn out 600 tons of metal or more per day each.

James A. Campbell, trustee in bankruptcy for the Continental Iron Company, Niles, Ohio, advises us that it is his intention to operate the mill at Wheatland, Pa., if enough business can be secured that will justify doing so. However, this has not yet developed, and it may be some little time before this mill will be put in operation.

The Solid Steel Casting Company of Chester, Pa., owing to the great demand for their make of open hearth steel castings, have been compelled to greatly enlarge their works. They are equipping a new open hearth foundry 200 x 45 feet, building a new 25-ton furnace, and adding considerable new machinery, consisting of new traveling cranes, large cold cutting saws, planers, &c. These improvements are expected to be completed by February 1, 1901, at which time their output will be increased to about 1,500,000 pounds per month.

The Shenango Steel Company's blast furnace at Sharon has resumed after several months' idleness. The Claire Furnace at Sharpsville, controlled by M. A. Hanna & Co. of Cleveland, will be started up soon.

There is a movement at Sharon to form a stock company to purchase the idle plate mill of the Republic Iron & Steel Company at Sharon and place it in operation.

The new furnace of the Sharon Steel Company, at South Sharon, will not likely be put in blast before April 1. The nail mill has been completed and new machinery is being installed. Much of it is from Germany.

R. C. Neal, the president of the Harrisburg Rolling Mill Company, has purchased from the McCormick estate and former Senator Cameron the entire plant of the Harrisburg Rolling Mill Company, including the rolling mill, office and 48 dwellings, and 15 acres of land. It is a personal purchase.

Machinery.

The Youngstown Foundry & Machine Company, at Youngstown, Ohio, recently took a contract for a very large lot of machinery for the National Steel Company, at Youngstown. The order books of this concern are so crowded that they have been compelled to refuse orders for prompt shipment, not being able to make delivery. This concern recently installed a 36-inch lathe, 27 x 36 feet, from the Pond Machine Tool Company, at Plainfield, N. J.

The New Era Iron Works Company, Dayton, Ohio, manufacturers of the New Era gas engine, are to put in a number of new milling machines, twist lathes, automatic tools, &c. Though their plant was newly equipped only a year ago, the great demand for their engines compels their increasing their facilities.

Scott Braddock and A. T. Hall, Logan, Ohio, have purchased the Logan Foundry & Machine Company from Pierce McKay. The name of the plant will remain unchanged.

W. H. Nicholson & Co., of Wilkes-Barre, Pa., have recently erected a warehouse and also built a new office. During the present year their output has about doubled that of any previous

one, their business with railroads having greatly increased. Among shops they have recently equipped with their expanding lathe mandrels are Jno. A. Roebbling's Sons & Co., Trenton, N. J.; Jones & Laughlins, Pittsburgh, Pa.; Henry R. Worthington Pump Works, Brooklyn, N. Y.; Brooks Locomotive Works, Dunkirk, N. Y.; Pennsylvania Steel Company, Steelton, Pa.; New York Shipbuilding Company, Philadelphia, Pa., and the Midvale Steel Company, Philadelphia, Pa. Their business in the Nicholson compression shaft coupling is steadily increasing. The company contemplate further extensions of their plant during the coming year.

The Jeansville Iron Works Company, Jeansville, Pa., have recently closed a contract with the Lebanon, Ky., Water Works Company for a 1,000,000-gallon triple expansion pumping engine; the Montana Ore Purchasing Company, Butte, Mont., for two compound condensing mine pumps, and two duplex jet condensers; the Butte Consolidated Mining Company, Butte, Mont., for a triple expansion mining pump for a 1400-foot lift, and for the same company a 1,000,000-gallon compound mining pump with a 600-foot lift. They have also closed a contract with the Consolidation Coal Company, Frostburg, Md., for a 2,000,000-gallon capacity mine pump designed expressly to be operated by compressed air, and a 7,000,000-gallon capacity mining pump, for the Jefferson & Clearfield Coal Company, near Reynoldsville, Pa. This is the second one of the same type made for them within the past two months. The pump repair department of the company is very busy and has become so extensive as to keep a considerable force of men employed all the time.

Houston, Stanwood & Gamble, Covington, Ky., have just secured a contract from the Allegheny Valley Plate Glass Company to supply that concern with eight 150 horse-power and ten 125 horse-power engines to be used by the glass factory. The entire contract amounts to \$20,000. The Houston, Stanwood & Gamble Company have at present sufficient business ahead to keep them busy for the next three months in the new year, while the year just closing indicates an increase of 50 per cent. over 1899, which latter was the best business year enjoyed by them.

The Marinette Iron Works, Marinette, Wis., are building a 120 horse-power engine to be put on exhibition at the Buffalo Pan-American Exposition. Another 120 horse-power engine is being built for Pittsburgh parties and besides these a 100 and two 75 horse-power engines are under construction.

The Edward P. Allis Company, Milwaukee, Wis., will remove the Buffalo branch of their works to Milwaukee some time in the coming year. The Buffalo plant employs 500 men in building engines.

The Model Machine Company, Bridgeport, Conn., have incorporated with a capital stock of \$2500. This company were organized to operate the Modern Machine Shop, which was formally run by W. E. Patchin, president of the new company. They make special machinery.

Jas. Leffel & Co., Springfield, Ohio, will in the near future considerably enlarge their turbine water wheel works, and will want some machinery, lathe, boring mill, &c.

The Nurdyke-Marmon Company, Indianapolis, Ind., have the new three-story building 200 x 60 feet under roof, and when this is occupied, with the several large buildings already occupied, they will have the largest plant for manufacturing milling machinery in the United States.

The Kingsford Foundry & Machine Works, Oswego, N. Y., advise us that the East Berlin Company have their contract for the erection of their new boiler plant, which is to be of brick and iron construction 315 x 100 feet. The plant will be equipped with modern tools which will be electrically driven with independent motors. A 30-ton traveling crane covering a span of 50 feet is to be installed. The company expect to have possession of their new plant between February 1 and 15.

The International Boiler Works Company, East Stroudsburg, Pa., have been making additions to their plant as follows: a 10-ton pneumatic traveling crane manufactured by the Chisholm & Moore Mfg. Company, Cleveland, Ohio, and new pneumatic hoists have been fitted to all their old cranes. They have also installed a new class of duplex compound Ingersoll air compressor for furnishing air for the pneumatic tubes and one 9-foot Caskey pneumatic riveter. They have recently erected a new office building, 30 x 36 feet, two stories. The additions made enable the company to turn out the largest work quickly and on the most advantageous terms.

C. A. Lawton & Co. of De Pere, Wis., have just replaced their old cupola with one of the latest improved Whiting patent cupolas. This, together with a new Buffalo blower, gives them a melting capacity of about 5 tons per hour, nearly doubling their former output. C. A. Lawton & Co. are at present executing an order for a three-saw edger and a two-saw trimmer for C. & O. Schwartz of Green Bay, Wis. These machines will be used in the company's new mill near Forence, Wis., where they have large lumber interests.

The Leetonia Boiler Company, Leetonia, Ohio, who were recently organized, have purchased the plant of and succeeded Woodward Bros. in the manufacture of boilers, tanks, stacks and all kinds of sheet and structural work. The new company

will enlarge and greatly improve the works and they invite correspondence.

Baughner, Kurtz & Co., Limited, York, Pa., founders and machinists, inform us that they have just finished a contract for machinery castings, to be delivered in Pittsburgh, that they commenced on September 28, 1899, and have orders ahead for machinery castings. They are also very busy in their car casting department, running full heats of 35 to 40 tons per day.

P. J. Clark & Co., Tifton, Ga., have purchased the Tifton Foundry & Machine Works from W. B. Durst and J. J. Golden. The new firm will largely increase their facilities in both their machine shop and foundry.

The General Electric Company, 44 Broad street, New York City, will add 200 feet to building No. 16, and this is one of the many building operations which will be carried on at Schenectady next year. A contract for the new office building was closed last week. In addition to this they will erect a new pattern shop and add a third floor to No. 26. These improvements and changes will make it necessary to also take care of some other building operations which have not yet been decided upon, so that altogether the Schenectady works will receive a number of large additions in the way of floor space during the coming year.

The Iroquois Iron Works, Buffalo, N. Y., manufacturers of machinery and tools, have increased their capital stock from \$100,000 to \$500,000, of which about \$300,000 has been issued. They are doing this in order to increase their capacity for the manufacture, sale and rental of railroad plants for asphalt paving, together with other kinds of machinery.

The Storey General Electric Company, formerly the Storey Motor & Tool Company, have just completed the removal of their offices and factory from Trenton, N. J., to a larger and newly equipped factory at Harrison, N. J. The new company, who are capitalized at \$3,500,000, are the outgrowth of the steadily increasing demand for the well-known Storey motors, and with the larger facilities in shop room, machinery, &c., they will be able to take up a number of additional lines which it has been impossible to handle before on account of lack of proper facilities. I. E. Storey is president of the new concern and Theo. W. Myers, formerly comptroller of New York City, is treasurer.

Considerable Detroit capital has been put into the Sintz Gas Engine Company, Grand Rapids, Mich., and next September the plant will be removed to Detroit. The management will continue the same as at present and the capacity of the works will be increased at least three times.

The Norton Emery Wheel Company, Worcester, Mass., are building a four-story brick addition 40 x 60 feet. Increased business necessitated the enlargement of their plant.

Work is brisk at the Dickson Mfg. Company's shops, at Scranton, Pa., and several large orders have been received during the past two weeks. Chief among them is the contract for six large engines, given by a New York State company. The engines are of the cross compound variety and will be of 5000 horse-power each. They will be of large dimensions, the cylinders being 43 x 60 and 88 x 60. Two large steel cranes are being made for a refrigerating company of New York, and when finished they will weigh 4 tons each. Two blowing engines are being built for a refining and smelting company in Utah, and a pair of cross compound pumps are in course of construction, which will be sent to Montana. Four cross compound engines, whose cylinders are 20 x 42 and 38 x 42, are being made for a cement company of New York and another pair of cross compound engines is being built for the Schenectady Locomotive Works; 17 x 42 and 28 x 42 are the dimensions of the cylinders.

E. Hodge & Co., East Boston, Mass., builders of marine and stationary boilers, are building a brick and wood boiler shop, 67 x 300 feet, which will be equipped with a traveling crane and modern boiler making tools. The location of the new shop is on the water front. The firm are also building a new wharf 20 feet wide and 400 feet long.

The Davis-Price Foundry & Machine Company, New Cumberland, W. Va., are now operating the plant of the Shetter Foundry & Machine Company. The new company are making extensive repairs in the machine shop and will install a new cupola in the foundry. They will manufacture clay working and mine machinery and expect to have their plant in full operation about January 1.

The Northern Engineering Works, Detroit, Mich., report a steadily increasing business in cranes. Their shop has been well filled during the entire year. Much of their product has gone abroad, but the bulk of it has been placed in the best American shops. They manufacture a variety of styles of electric traveling cranes, as well as hand power, pneumatic and other types. The company have installed considerable new machinery during the past year and contemplate adding more equipment. A new structural shop for making their own girders was added during the year.

We can state officially that a majority of the stock of the Canton Roll & Machine Company, at Canton, Ohio, manufacturers of chilled rolls and tin plate machinery, has been sold

to J. B. Baird of Chicago, who has been elected president of the concern. The report that the sale was made in the interests of the American Tin Plate Company and that the output of the plant will hereafter be controlled by that concern has not been officially confirmed.

The Southern Co-operative Foundry Company, North Rome, Ga., will build a large warehouse near their plant. This industry has prospered well from the beginning.

P. B. Clark, Rumford Falls, Maine, has his new foundry completed and made his first casting December 10.

H. Brewer & Co., Tecumseh, Mich., who were recently incorporated, are a reorganization of the old copartnership of H. Brewer & Co., manufacturers of clay working machinery, who have been doing business under that name since 1859.

Pattin Bros. & Co., Marietta, Ohio, have just completed a new brick foundry and pattern shop for the production of gray iron and brass castings of every description. The molding room is 50 x 120 feet, with a traveling crane the entire length. The cupola room is 16 x 32 feet and the pattern shop 26 x 38 feet. The entire equipment is modern and up to date.

Hardware.

The Scranton Iron Fence & Mfg. Company, Scranton, Pa., have just completed a contract for fencing Washington's headquarters at Newburgh, N. Y. The work consists of over 700 feet of pipe fence on wall and same amount of wrought iron fence around lawn slope. They have also finished a fancy wrought iron guard for the interior of the Onondaga National Bank, Utica, N. Y. The company are extending their line of manufacture of wrought iron and grille work for interior decoration, and are now equipped to fill orders for such on short notice.

Miscellaneous.

The Morris Electric Company, 15 Cortlandt street, New York, intend to build a new factory at East Orange, N. J., where they will manufacture street cars and a general line of street railway supplies.

The Superior Drill Company's works at Springfield, Ohio, after several weeks' shut down at the close of their business year, are again in operation. This company employ a large number of men and expect to keep their works running during the business year 1901.

The Harris Safety Valve Company, Williamsport, Pa., whose head office is at 1133 Broadway, New York, are very busy manufacturing large numbers of their fire escapes, automatic and portable, mechanical fire alarms, chemical extinguishers and fittings for modern safety fire appliances.

The officials of the American Tin Plate Company, on a tour of inspection of their different plants, made certain propositions to business men at Ellwood City, Pa., concerning their plant there, which, if accepted, will probably result in the increase of the mill there to double its present capacity. This plant has not been operated for six months and considerable talk of an independent mill is indulged in.

The International Time Recording Company, Binghamton, N. Y., manufacturers of Bundy and Rochester time recorders and Standard time stamps, will build a brick and iron fire proof addition to their building for a brass foundry and boiler house, the size of which will be 22 x 52 feet. They have contracted for a 125 horse-power boiler, and have purchased a Fischer double valve engine, direct connected to a Crocker-Wheeler generator of 100 horse-power capacity. They have also contracted with the Crocker-Wheeler Company for the installation of this complete plant, including motors on each floor of their building, and will have a complete electrical transmission of power throughout their entire factory. The contract with the Crocker-Wheeler Company provides for the completion and passing over to them within eight weeks from the time the order was given.

The Sharon Brass Mfg. Company, a new enterprise at Sharon, Pa., have placed an order for an overhead crane for their plant and are also erecting a cupola for a smelting capacity of 7000 pounds per day. Orders have so increased on their hands that in addition to their Ellsworth steel works the company have leased the old Andrews brass foundry in Sharon and will at once put it in operation.

The Flour City Ornamental Iron Works, Minneapolis, Minn., have recently incorporated. The business was established in 1893 by E. Tetzlaff, F. Schilling, E. Rubbert and L. B. Vollmer, who are the directors of the new company. They will largely increase the capacity of their plant.

The McClintic-Marshall Construction Company of Pittsburgh have taken a contract for the building of a bridge for the Pennsylvania Railroad to cross the Pittsburgh Junction line at Ben Venue, Pittsburgh, and also for the steel work in the new erecting shop of the Pennsylvania Railroad at Altoona and for a runway for a 100-ton traveling crane at the same place; also for extensive steel structure work for the Brooks Locomotive Works at Dunkirk, N. Y.

The Lewis Spring & Axle Company, Jackson, Mich., inform us that their spring department was entirely destroyed by fire and it will be eight or ten weeks before it will be in operation again. They expect to resume business in the axle department at once.

The Iron and Metal Trades.

A Comparison of Prices.

At date, one week, one month and one year previous.

Advances Over the Previous Month in Heavy Type. Declines in Italics.

	Dec. 26, 1900.	Dec. 19, 1900.	Nov. 28, 1900.	Dec. 27 1899.
PIG IRON:				
Foundry Pig, No. 2, Standard, Philadelphia.....	\$15.50	\$15.75	\$15.50	\$23.25
Foundry Pig, No. 2, Southern, Cincinnati.....	13.75	13.75	13.75	20.50
Foundry Pig, No. 2, Local, Chicago.....	15.00	15.00	14.50	23.50
Bessemer Pig, Pittsburgh.....	15.25	13.50	13.75	24.90
Gray Forge, Pittsburgh.....	13.25	13.25	13.25	21.00
Lake Superior Charcoal, Chicago.....	19.50	19.50	18.50	25.00
BILLETS, RAILS, ETC.:				
Steel Billets, Pittsburgh.....	19.75	19.75	19.75	33.00
Steel Billets, Philadelphia.....	21.00	21.00	21.00	nom.
Steel Billets, Chicago.....	20.75	20.75	20.75	nom.
Wire Rods, Pittsburgh, nominal.....	33.00	33.00	33.00	nom.
Steel Rails, Heavy, Eastern Mill.....	26.00	26.00	26.00	35.60
Spikes, Tidewater.....	1.50	1.50	1.50	2.65
Splice Bars, Tidewater.....	1.35	1.35	1.35	2.30
OLD MATERIAL:				
O. Steel Rails, Chicago.....	11.00	11.00	11.00	19.00
O. Steel Rails, Philadelphia.....	16.00	16.00	15.50	32.00
O. Iron Rails, Chicago.....	17.50	17.50	17.50	25.00
O. Iron Rails, Philadelphia.....	18.00	17.50	17.50	27.00
O. Car Wheels, Chicago.....	15.50	15.50	16.00	30.00
O. Car Wheels, Philadelphia.....	17.00	17.00	16.50	21.00
Heavy Steel Scrap, Chicago.....	11.00	11.00	10.50	18.00
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia.....	1.45	1.40	1.40	2.05
Common Iron Bars, Chicago.....	1.45	1.45	1.45	2.30
Common Iron Bars, Youngstown.....	1.30	1.30	1.30	2.15
Steel Bars, Tidewater.....	1.40	1.40	1.40	2.35
Steel Bars, Pittsburgh.....	1.25	1.25	1.25	2.20
Tank Plates, Tidewater.....	1.55	1.55	1.50	2.40
Tank Plates, Pittsburgh.....	1.40	1.40	1.35	2.25
Beams, Tidewater.....	1.65	1.65	1.65	2.40
Beams, Pittsburgh.....	1.50	1.50	1.50	2.25
Angles, Tidewater.....	1.55	1.55	1.55	2.40
Angles, Pittsburgh.....	1.40	1.40	1.40	2.25
Skelp, Grooved Iron, Pittsburgh.....	1.85	1.52½	1.50	1.95
Skelp, Sheared Iron, Pittsburgh.....	1.60	1.55	1.60	2.35
Sheets, No. 27, Pittsburgh.....	2.85	2.85	2.75	2.80
Barb Wire, f.o.b. Pittsburgh.....	2.80	2.80	2.80	3.55
Wire Nails, f.o.b. Pittsburgh.....	2.30	2.30	2.30	2.95
Cut Nails, Mill.....	1.95	1.95	1.95	2.45
METALS:				
Copper, New York.....	17.00	17.00	16.75	16.50
Spelter, St. Louis.....	4.00	3.95	4.15	4.55
Lead, New York.....	4.37½	4.37½	4.37½	4.70
Lead, St. Louis.....	4.30	4.30	4.22½	4.60
Tin, New York.....	28.00	25.50	28.25	24.00
Antimony, Hallett, New York.....	9.25	9.25	9.50	9.75
Nickel, New York.....	55.00	55.00	55.00	38.00
Tin Plate, Domestic Bessemer, 100 lbs., New York.....	4.19	4.19	4.19	4.84

Chicago.

Office of *The Iron Age*, 1305 Fisher Building, 1
CHICAGO, December 24, 1900.

Although the market in general is quiet now, the outlook for business is very flattering for the coming year. The fact is becoming more strongly apparent that the trade had no accurate conception of the volume of business waiting for the settlement of the Presidential election and of other problems of the year. Numerous manufacturing consumers who contracted for their wants late in the summer or during the fall are now finding that they had seriously underestimated their requirements. They are demanding increased shipments, in many instances taking in three months what they expected would last them for half a year.

Pig Iron.—Trade is mainly confined to small lots. An occasional buyer places an order for 500 tons, and some consumers are duplicating orders placed some time since, but these are not for large tonnages. Inquiries are numerous, but buyers are not in such a hurry to close as some time since. Most of the business now doing is going to Southern companies, as Southern prices are at present under those asked by the local makers. Shipments are very heavy from both Northern and Southern furnaces. The Calumet Furnace will be blown in early in January. Quotations are as follows:

Lake Superior Charcoal.....	\$19.50 to \$20.00
Local Coke Foundry, No. 1.....	15.50 to 16.00
Local Coke Foundry, No. 2.....	15.00 to 15.50
Local Coke Foundry, No. 3.....	14.50 to 15.00
Local Scotch, No. 1.....	15.50 to 16.25
Ohio Strong Softeners, No. 1.....	16.25 to 16.50
Southern Silvery, according to Silicon.....	16.10 to 16.60
Southern Coke, No. 1.....	15.35 to 15.85
Southern Coke, No. 2.....	14.60 to 15.10
Southern Coke, No. 3.....	14.10 to 14.60
Southern Coke, No. 1 Soft.....	15.35 to 15.85
Southern Coke, No. 2 Soft.....	14.60 to 15.10
Foundry Forge.....	13.60 to 14.10

Gray Forge and Mottled.....	13.60 to 14.10
Southern Charcoal Softeners, according to Silicon.....	15.00 to 17.00
Tennessee Silicon Pig.....	17.00 to 18.50
Alabama and Georgia Car Wheel.....	20.00 to 20.35
Malleable Bessemer.....	15.00 to 15.50
Standard Bessemer.....	15.00 to 15.50
Jackson County and Kentucky Silvery, 8 per cent. Silicon.....	17.50 to 18.50

Bars.—Business is rather quiet, but inquiries indicate that a great deal of new contracting will be done in the near future. The outlook for general business is so good that some large consumers are now figuring on placing orders for their whole year's requirements. Large buyers are asking for increased shipments on their contracts. Mill shipments of Common Iron are firm at 1.45c. to 1.50c., Soft Steel Bars, 1.40c. to 1.45c., and Hoops, 1.95c., base, Chicago. Jobbers report a continued good demand from stock. Prices on small lots from store are maintained at 1.75c. to 1.80c. for Common Iron, 1.60c. to 1.70c. for Steel Bars and 2c. to 2.20c. for Hoops.

Car Material.—All kinds of material entering into the construction of cars are in steady demand. The trade has never before seen anything like the current demand from car builders.

Structural Material.—Figuring is now proceeding on the Marshall Field Building, which will take 7000 tons. The contract may be placed this week. A good run of orders is reported from the general trade, ranging from carloads to 500 tons. Mill shipments are quoted as follows: Beams, Channels and Zees, 15 inches and under, 1.65c.; 18 inches and over, 1.75c.; Angles, 3 inches and over, 1.55c.; Angles, under 3 inches, 1.45c. rates; Tees, 1.70c.; Universal Plates, 1.55c. Small lots of Beams and Channels from local yards are quoted at 2.10c. to 2.25c.; Angles, 1.60c. to 1.70c. rates, and Tees, 1.75c. to 1.85c.

Plates.—The local mills are selling more than they are making. Inquiries for several thousand tons are now in hand. Jobbers continue to have a better demand from stock than usual at this season. Mill shipments of Tank Plate, ¼-inch and heavier, in carload lots, are quoted at 1.55c. to 1.60c., Chicago; Flange, 1.65c.; Marine, 1.75c. Jobbers quote small lots from store at 1.80c. to 2c. for Tank, and 2c. to 2.10c. for Flange.

Sheets.—Heavy buying is still going on. Large consumers are now realizing the difficulty of getting enough material to satisfy them, which was pointed out some time ago. A great deal of buying now being done is for the purpose of accumulating stock which will be needed for the spring trade. The material is being taken in and stored so that the consumers will be sure to have it on hand. Jobbers are having a larger demand from stock than usual at this season and are still receiving orders from jobbers further west who are obliged to replenish their stocks and cannot wait for shipments from manufacturers. Mill shipments of No. 27 Black Sheets continue to be quoted at 3.10c., Chicago, while Galvanized Sheets are held at 75 and 10 and 5. Small lots from stock are quoted at 3.25c. to 3.30c. for No. 27 Black, 2.40c. for No. 16, 2.30c. for No. 14, 2.10c. for No. 12, 2c. for Blue Annealed No. 10, and 75 off for Galvanized.

Merchant Pipe.—The situation continues as satisfactory as before, manufacturers having a very good demand. Manufacturers' prices, random lengths, are as follows:

	In carloads. Blk. Galvd.	Less than carloads. Blk. Galvd.
½ to ¾ inch and 11 to 12 inches.....	59.2 46.2	54.9 40.9
¾ to 10 inches.....	66.7 53.3	61.9 49.9

Boiler Tubes are moderately active. Quotations are continued as follows:

	Steel.	Iron.
1 to 2½ inches, inclusive.....	50	40
2½ inches.....	50	42½
2½ to 5 inches.....	60	50

Rails and Track Supplies.—A sale of 17,000 tons of Steel Rails for export to Australia has been made, the order also including about 2000 tons of Fastenings. These Rails will be rolled at Lorain, Ohio. Another export order for about 20,000 tons is expected shortly to be placed. Domestic business for the week has aggregated over 50,000 tons. A great deal of tonnage is in sight, amounting to over 150,000 tons, which will be placed in

the near future. The demand for Light Rails proceeds steadily. The Illinois Steel Company have never done such a business in Light Rails as this year. It is believed that they have exceeded any other mill rolling Light Rails by at least 25 per cent. Prices are unchanged, but the situation is so strong that they are likely to be advanced any day. Heavy Sections are still quoted at \$26 and Light Sections at \$25.50 to \$28, according to weight. Track supplies are quite active, with Splice Bars quoted at 1.40c.; Spikes, 1.65c. to 1.75c.; Track Bolts, with Hexagon Nuts, 2.55c., and Square Nuts, 2.40c.

Merchant Steel.—The business of the week shows an increase. Jobbers are buying for stock, notwithstanding the near approach of the close of the year. Mills are receiving all the specifications they can conveniently handle. Mill shipments, Chicago delivery, are quoted as follows: Smooth Finished Machinery Steel, 1.75c. to 1.90c.; Smooth Finished Tire, 1.75c. to 1.95c.; Open Hearth Spring Steel, 2.15c. to 2.40c.; Toe Calk, 2.40c. to 2.60c.; Sleigh Shoe, 1.70c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 57 off. Ordinary grades of Crucible Tool Steel are quoted at 6c. to 7c.; Specials, 13c. upward.

Old Material.—Dealers are somewhat firmer in their views, expecting that after the turn of the year they will find consumers more disposed to purchase stock. The volume of current business is quite small. The following are approximate quotations per gross ton:

Old Iron Rails.....	\$17.50 to \$18.50
Old Steel Rails, mixed lengths.....	11.00 to 11.50
Old Steel Rails, long lengths.....	14.00 to 15.00
Relaying Rails.....	20.00 to 22.00
Old Car Wheels.....	15.50 to 16.00
Heavy Melting Steel Scrap.....	11.00 to 11.50
Mixed Steel.....	9.00 to 9.50
Iron Fish Plates.....	17.50 to 18.00
Steel or mixed do.....	10.00 to 10.50
Iron Car Axles.....	19.50 to 20.00
Steel Car Axles.....	16.00 to 16.50
No. 1 Railroad Wrought.....	15.50 to 16.00
No. 2 Railroad Wrought.....	13.50 to 14.00
Shafting, Iron and Soft Steel.....	17.00 to 17.50
No. 1 Dealers' Wrought.....	11.00 to 11.50
No. 1 Mill.....	7.50 to 8.00
No. 2 Mill.....	6.00 to 6.50
No. 1 Busheling.....	8.50 to 9.00
No. 2 Busheling.....	7.50 to 8.00
Iron Car Axle Turnings.....	10.00 to 10.50
Soft Steel Axle Turnings.....	8.50 to 9.00
Machine Shop Turnings.....	7.50 to 8.00
Wrought Drillings.....	6.00 to 6.50
Cast Borings.....	4.00 to 4.50
Mixed Borings and Turnings.....	5.00 to 5.50
No. 1 Boilers, cut.....	9.50 to 10.00
Boiler and Ship Scrap.....	8.00 to 8.50
No. 1 Cast.....	13.00 to 13.50
No. 2 Cast.....	9.50 to 10.00
Railroad Malleable Cast.....	13.00 to 13.50
Agricultural Malleable Cast.....	10.50 to 11.00

Metals.—Prices are steady, but quotations are unchanged. Carload lots of Lake are quoted at 17½c., and Casting brands at 17¼c. Pig Lead is only moderately active, with Desilverized held at 4.32½c. and Corroding at 4.42½c. in 50-ton lots.

Coke.—Considerable contracting is being done, numerous foundrymen placing orders to cover their requirements for the first six months of next year. Quotations on 72-hour Coke are continued at \$4.50 to \$5.

Philadelphia.

Office of The Iron Age, Forrest Building, {
PHILADELPHIA, Pa., December 24, 1900. }

The tone of the market is remarkably strong, and it is believed that the year closes with brighter prospects than ever known before. The demand is immense, and prices (when costs for the coming year are adjusted) will no doubt be satisfactory to manufacturers and consumers alike. There will certainly be plenty of business, and there ought not to be much difficulty in regard to prices. The amount of work in hand in the large establishments breaks all records, that in the Delaware shipyards alone amounting to over \$30,000,000, with lots more in prospect. The same may be said in regard to the locomotive and bridge works, and in fact the same general statement may be made in regard to almost every industry pertaining to Iron and Steel. Next year is, therefore, expected to surpass all former records, and while 1900 has been unsatisfactory on account of the sudden and heavy decline in prices, no such mishap is likely to occur during 1901. The trade are therefore in a very cheerful frame of mind, and find it no great effort to extend their congratulations all around.

Pig Iron.—There has been a very fair demand for Iron during the past week, although, of course, nothing like what there was during the previous five or six weeks. A great deal of Iron is wanted, however, and shipments keep pace with the furnace output, so that there is no weakening, nor any accumulation of stocks likely to affect the market adversely. A little slackening up may be expected from now until well into January, but all the indications point to a period of extraordinary activity during the spring and summer months, and in the meanwhile prices are not likely to change much, if at all. Some of the fancy brands command quite a large premium, while new candidates are at a corresponding discount, but the average of last week is fully maintained, the extreme range being about as follows for Philadelphia and nearby points: No. 1 X Foundry, \$16.50 to \$17; No. 2 X Foundry, \$15.50 to \$16.25; No. 2 Plain, \$14.75 to \$15.25; Standard Gray Forge, \$14.50 to \$15; Ordinary Gray Forge, \$14 to \$14.25; Basic, \$14.75 to \$15.

Billets.—There is no change; prices appear to be definitely fixed at \$21 for Bessemer and \$22 and upward for Open Hearth. Sales not important of late.

Plates.—There is a continued good demand for Plates, and while nothing heavy is likely to be done until after the holidays, there is enough work on hand to carry the mills well through the winter months. A great deal of new business is being figured on, and options are said to be out for an immense tonnage, all of which is likely to result in business in the not very distant future. Prices are firm with some indications of a further slight advance, but for the present quotations are as follows: Plates, ¼-inch and thicker, 1.55c. to 1.60c.; Universals, 1.55c. to 1.60c.; Flange, 1.65c. to 1.75c.; Charcoal Iron Plates, C. H. No. 1, 2.25c.; Best Flange, 2.75c.; Fire Box, 3.25c.

Structural Material.—In this department a very encouraging degree of activity is maintained, with prospects of still heavier demands during the spring and summer months. All departments are full and prices firm, as follows, viz.: Angles, 3-inch and upward, 1.65c. to 1.75c.; less than 3 inches, 1.50c. to 1.60c.; Beams and Channels, 15-inch and upward, 1.65c. to 1.75c.

Bars.—The Bar trade is experiencing a surprising degree of activity, considering the season, and manufacturers say they are pushed for deliveries in every direction. There may be a little set back during the next three or four weeks, but in the meanwhile mills have all the orders they can take care of and at firm prices, as follows, city or nearby points: Refined Iron Bars, 1.45c. to 1.55c.; Steel Bars, 1.40c. to 1.50c.

Sheets.—Business is active in all departments, the demand being unprecedentedly large for the season. Prices strong, quotations for the best Sheets being as follows (common Sheets two-tenths less): No. 10, 2.20c.; No. 14, 2.40c.; No. 16, 2.60c.; Nos. 18-20, 3.10c.; Nos. 21-24, 3.20c.; Nos. 26, 27, 3.30c.; No. 28, 3.40c.

Old Material.—There is a somewhat mixed market, but unless buyers pick up job lots when they are offered, the chances are that they will pay more money when they have to secure material, as holders are very firm and confident of their position. Bids and offers for deliveries in buyers' yards are about as follows: Choice Railroad Scrap, \$18 to \$18.50; No. 1 Yard Scrap, \$13 to \$14; No. 2 Light Scrap, \$11.50 to \$12.50; Machinery Cast, \$14.50 to \$15; Heavy Steel Scrap, \$15.50 to \$16; Old Iron Rails, \$18 to \$18.50; Old Steel Rails, \$16 to \$16.50; Wrought Turnings, \$9.75 to \$10.25; Cast Borings, \$7.75 to \$8.25; Old Car Wheels, \$17 to \$18; Iron Axles, \$20 to \$22; Steel Axles, \$17 to \$18.

The Standard Seamless Tube Company, at Ellwood City, Pa., have just closed a deal with the National Tube Company whereby all the products of the Standard mill will be used by the National Tube Company. This will insure a steady run for the next five years and may result in the enlargement of the capacity of the Ellwood City mill. The deal will go into effect the first of the year, when a large force of men will be put on at the Ellwood mill.

Cincinnati. (By Telegraph.)Office of *The Iron Age*, Fifth and Main streets, }
CINCINNATI, December 26, 1900.

While there has been but comparatively little trading in Pig Iron throughout the past week, it is a matter of some surprise to find that the volume of inquiry is very much ahead of what it was seven days ago. Some of the queries are for round lots of Iron, and the general character of this feature of the business betokens some active trading in the near future. It is the general opinion of sellers that stocks in the hands of consumers are much lower upon the average than they usually are at this season. It will be remembered that the buying movement of three or four weeks ago was in the main for quick delivery stock. All of this taken together is making the market very steady, not to say strongly inclined upon the basis of last week's quotations. While there are a few rumors to the effect that some Pig Iron can still be bought on the basis of \$10.75 for No. 2, Birmingham, yet there is not substance enough in these reports to justify entering that figure as a quotation. The general selling price to-day is based upon the minimum figures given herewith. Basic Iron is strong and unchanged. There is no change in freight rates, and the situation on the whole is practically unchanged from what it was a week ago. Freight rate from Birmingham is \$2.75 to this point; from Hanging Rock district, \$1. We quote, f.o.b. Cincinnati:

Southern Coke, No. 1.....	\$14.25 to \$14.50
Southern Coke, No. 2.....	13.75 to 14.00
Southern Coke, No. 3.....	12.75 to 13.00
Southern Coke, No. 4.....	12.50 to 12.75
Southern Coke, No. 1 Soft.....	14.25 to 14.50
Southern Coke, No. 2 Soft.....	13.75 to 14.00
Southern Coke, Gray Forge.....	12.50 to 12.75
Southern Coke, Mottled.....	12.50 to 12.75
Ohio Silvery, No. 1.....	17.00 to 17.50
Ohio Silvery, No. 2.....	16.00 to 16.50
Lake Superior Coke, No. 1.....	15.50 to 16.00
Lake Superior Coke, No. 2.....	14.50 to 15.00
Lake Superior Coke, No. 3.....	13.50 to 14.00
Southern Basic.....	to 14.25

Car Wheel and Malleable Irons.

Standard Southern Car Wheel, chilling grades.....	\$18.75 to \$19.75
Standard Southern Car Wheel, No. 2.....	17.75 to 18.75
Lake Superior Car Wheel and Malleable.....	19.00 to 20.00

Plates and Bars.—The market is steady and normally active. Quotations are unchanged. We quote, f.o.b. Cincinnati: Iron Bars, in carload lots, 1.45c., with half extras; in small lots, 1.75c., with full extras; Steel Bars, in carload lots, 1.40c., with half Steel card extras; Base Angles, in carload lots, 1.50c. to 1.55c.; Plates, 1.55c. for $\frac{1}{4}$ -inch and heavier; Sheets, No. 10, 1.95c.

Old Material.—The market is quiet and steady on an unchanged basis. Dealers' buying prices per gross ton are, f.o.b. Cincinnati: No. 1 Wrought Railroad Scrap, \$15.25; Cast Railroad and Machinery Scrap, \$11; Old Iron Axles, \$17; Iron Rails, \$18; Steel Rails, rolling mill lengths, \$13; short lengths, \$12; Car Wheels, \$15.

St. Louis.Office of *The Iron Age*, 1205 Chemical Building, }
St. Louis, December 24, 1900.

Pig Iron.—The holiday dullness is quite noticeable this week, buying being confined to car lots. The sale of Missouri Iron mentioned in last report involved 5000 instead of 500 tons, the error as to tonnage occurring in transmission. The week has brought a fair inquiry, some reporting it as of greater volume than during previous weeks of this month. The tenor of communications indicates that stocks in consumers' yards are not large. Delivery dates are made close and in not a few instances those who bought in November are now asking that shipments be made earlier than contracts specify. Melting is keeping up remarkably well and promises to be even more active after the turn of the year. Prices are reported firm and unchanged. We quote, f.o.b. St. Louis:

Southern, No. 1 Foundry.....	\$15.00 to \$15.25
Southern, No. 2 Foundry.....	14.50 to 14.75
Southern, No. 3 Foundry.....	14.00 to 14.25
No. 1 Soft.....	15.00 to 15.25
No. 2 Soft.....	14.50 to 14.75
Gray Forge.....	13.50 to 13.75

Bars.—Conditions remain about as last reported. Mills are not writing up new business to any great extent, as jobbers are preparing for annual stock taking. The con-

suming trade is very active, as shown by a buying movement to jobbers unusual for December. One of the large mills report their price on Steel Bars as advanced 10c. above quotations below. Mill prices for both Iron and Steel in heavy tonnage are 1.45c. to 1.50c., half extras, East St. Louis. Jobbers' price on less than carloads is 1.75c. to 2c., full extras.

Rails and Track Supplies.—Track Supplies are still in good demand. A sale of 5000 tons Standard Rails may be reported. We quote: Splice Bars, 1.50c. to 2c.; Bolts, with Square Nuts, 2.20c. to 2.30c.; with Hexagon Nuts, 2.30c. to 2.40c.; Spikes, 1.70c. to 1.80c.

Pig Lead.—Trading dull and lacking snap. Common Lead is unchanged at 4.20c.; better brands, 4.22 $\frac{1}{2}$ c.; Chemical, 4.25c., and Desilverized, 4.32 $\frac{1}{2}$ c. Lead Ore remained at \$46 per ton.

Spelter.—Inquiries have been few, and active negotiations even less. Last known sale was made at 4c. Zinc Ore came down \$1, top price now resting at \$28 per ton.

Cleveland.

CLEVELAND, OHIO, December 24, 1900.

Iron Ore.—The reports have at last been compiled, showing the amount of Iron Ore that was moved down the chain of lakes during the season of navigation just brought to a close. These show a shipment of 18,570,310 gross tons, as against 17,901,196 tons for the same period last year. This is not commensurate with the increase in the lake tonnage, but simply represents the advantage the owners had this year over the season of 1899. The lakes opened two weeks earlier last spring than usual, and besides the docks have been free from strikes, which hindered the shipment a year ago. Seeing the conditions on the lakes the movement is not very encouraging. Of the total the following amounts came from the various ports: Two Harbors, 4,007,204 tons; Duluth, 3,888,986 tons; Escanaba, 3,436,729 tons; Marquette, 2,661,861 tons; Ashland, 2,633,687 tons; Superior, 1,522,889 tons; Gladstone, 418,851 tons. The feature in this report that is demanding the closest attention of the shippers and the Iron men is the comparative falling off in the old range Ores and the predominance of the Mesaba Ores.

Pig Iron.—The decrease in the price of Coke from \$2.75 to \$1.75 has admitted several new features into the situation that may in the end effect the lowering of the prices if the Ore Association acts in a similar manner. This possibility is making the buyers cautious as to that period which will be based upon the new scale, but does not seem to show any signs in the present trade. The buying now is light, owing to the approach of the season when inventories are taken, and it might be said that comparatively no Iron has been sold for immediate deliveries. The work of covering for the future, however, still goes on. The market is very strong at \$14 and \$13.50 for Nos. 1 and 2, respectively. Some of the furnaces which are filled up for the next 60 or 90 days are asking 50c. better, but this has not been paid. They quote these price, not being anxious for business. The sales have been so greatly in excess of production that the stock piles have been drawn from heavily in the last few weeks, and there are now signs of these dwindling away to nothing. This has induced a discussion of the possibility of some of the smaller furnaces coming into blast, this being made possible by the new contract price on Coke. Basic Iron is still selling in small quantities at \$13.50, with off Basic being sold at \$12.50. The transactions are decidedly light.

Finished Material.—The chief interest in the Finished Material market seems to center in the Steel Rail business. About all of the other lines report that the capacity of the mills has been about used up for from 60 to 90 days in the future, and some even beyond that date. The Steel Rail trade now is in supplying the demands of the suburban lines, this trade being particularly heavy. The steam lines have eased off on their buying to some extent. There was a story going this week that in order to obtain the Vanderbilt order a reduction was made in

the price by the mills, but this proves to be without foundation, as all contracts have been made on the pool basis. The bridge companies are all busy now, and are buying heavily of Plates and Angles, with some considerable portion of the business being done in Beams and Channels.

Old Iron.—The buyers having covered their immediate needs by recent heavy purchases, are now awaiting the lowering of the market, which they expect after the first of the year. They are also careful lest they overstock themselves for the first of the year, when they wish to make invoices. This has resulted in a dead week in the Scrap trade. No change of prices has been made, because of the light sales. The market, therefore, is nominally what it was a week ago: No. 1 Wrought, \$16; No. 1 Busheling, \$13; Heavy Steel, \$14; Turnings, \$9; Borings, \$6.50; Machinery Cast, \$13.

Pittsburgh.

Office of *The Iron Age*, Hamilton Building, {
Pittsburgh, December 26, 1900. }

(By Telegraph.)

Pig Iron.—The Bessemer Iron market was a little more active last week, sales aggregating probably 8000 tons. However there is not much incentive to buy Bessemer Iron at the present time, for the reason that with the lower prices of Ore and Coke, which are assured for next year, the cost of making Iron will be a good deal less than it was this year. However, the lower price of Ore will not be available until navigation opens. A considerable saving in Coke can be effected from the first of the year. There is a good deal of Bessemer Iron being offered on the market, as sales have been made at about \$13.25, Pittsburgh. There is a fair movement in Forge Iron, and the price is about the same as Bessemer, \$13.25, Pittsburgh. Foundry Iron is somewhat quiet. We quote Bessemer at \$13.25 to \$13.50; Forge, \$13.25 to \$13.50, and Foundry, \$13.50, all f.o.b. Pittsburgh. We note sales of 5000 to 6000 tons of Standard Bessemer at about \$13.25, Pittsburgh.

Billets.—Some of the large consumers of Steel are sending in specifications to the mills and at full pool prices. Every attempt was made to get Steel at lower prices, but without success. The market is strong, and as stated a fair amount of Steel is moving. We quote Bessemer Billets, Pittsburgh, Wheeling and the Valleys, at \$19.75, delivered. Billets smaller than 3½ inches are \$1 extra. Carbons higher than 0.21 and up to 0.60 are \$1 extra; 0.61 up to 1 are \$2 extra. Basic Open Hearth Steel, \$1 a ton extra over the price of Bessemer. For cutting small Billets, 50c. per ton extra.

Sheet Bars.—There is a good inquiry for Sheet Bars, and some of the smaller Sheet mills have so much faith in the situation that they have contracted for their supply of Bars for first six months at an advance over present prices. We quote Sheet and Tin Bars at \$20.75, delivered, Pittsburgh, Wheeling and Valley districts. For Cutting Sheet and Tin Bars, 50c. per ton extra.

Muck Bars.—The market does not seem to be quite as firm, and we quote Standard grades of Muck Bar at \$25.25. It is possible that \$25 could be done on a firm offer.

Rails.—We can state officially that the Carnegie Steel Company have taken an order for 6000 tons of Steel Rails for prompt delivery for shipment to the Great Eastern Railway of England. Some Norway business in Rails was offered to the Carnegie Company, but they had to turn it down as they could not make the deliveries. The Rail mills have already entered orders for about 1,000,000 tons of Rails for 1901, and it is expected that the Rail tonnage for next year will aggregate between 1,500,000 and 1,750,000 tons. We may also state that the price of Rails may be advanced about the middle of January.

Coke.—The Furnace Coke trade continues quiet, and reports are that some of the small operators are offering to shade prices. The leading interest, however, is holding Furnace Coke at \$1.75 a ton.

(By Mail.)

Announcement is made that a reduction in freight rates on Coke will be made, effective January 1. The exact amount of the reduction to be made has not yet been given out. It is also expected that about the same date freights on Pig Iron, Billets and articles of Iron and Steel east bound will be reduced. This, however, has not been officially confirmed. Nothing of special moment has occurred in the Iron trade during this week. There is very little demand for Pig Iron, and prices, especially on Bessemer, are weak. There is a better movement in Billets and Sheet Bars and at pool prices. There is only a fair volume of business in Finished Material, but prices are firm, and the expectation is that after the first of the year tonnage will materially increase. The mills are filled to the limit with orders, and on some kinds of material prompt deliveries are hard to obtain. The outlook for 1901 is regarded as decidedly favorable.

Plates.—There is a moderate demand for Plates, which, with old contracts, keeps the mills filled up, and several leading producers are not promising deliveries inside of two or three months. An enormous tonnage in Plates for export shipment is being taken by leading Plate mills, and on these contracts comparatively low prices are being made. It will be recalled that the market on Plates for export is open. There has been no change in prices, and we quote: Tank quality, ¼-inch and heavier, 1.40c.; 3-16-inch, 1.45c.; under 3-16-inch and above No. 10, 1.50c.; Flange or Boiler Steel, 0.1c. advance over base of Tank; Marine and Fire Box, American Boiler Manufacturers' Association specifications, 0.2c. advance over Tank; Still Bottom Steel, 0.3c. advance over Tank; Locomotive Fire Box Steel and equivalent specifications, 0.5c. advance over Tank, all f.o.b. Pittsburgh.

Structural Material.—No specially large contracts have recently been given out in this district. It is understood that the Beam agreement has been renewed for next year, with some slight modifications and rearrangement of allotment. A great deal of foreign work is being secured by mills in the Beam Association, and the American Bridge Company are understood to have taken additional foreign work calling for a good many thousand tons of material. We quote: Beams and Channels, up to 15-inch, 1.50c.; over 15-inch, 1.60c.; Angles, 3 to 6 inches, inclusive, 1.40c.; over 6 inches, 1.50c.; under 3 inches, 1.25c.; Zees, 1.50c.; Tees, 1.55c.; Steel Bars, 1.25c. to 1.35c., half extras, at mill; Universal and Sheared Plates, 1.40c., all f.o.b. Pittsburgh.

Bars.—Considering the season of the year the demand for Iron and Steel Bars is a most active one, and with contracts taken by the mills some time since, means that capacity of the Bar mills will be steadily employed for the next two or three months. Leading interests like the American Steel Hoop Company and the Republic Iron & Steel Company report a large volume of tonnage in Iron Bars, much larger in fact than usual at this season of the year. Prices are firm, and we quote Steel Bars at 1.25c. minimum, while some mills are quoting 1.30c. to 1.35c., half extras. We quote Iron Bars at 1.30c. at mill, and note that as high as 1.35c. is being quoted in some cases for carload orders. Special grades of Iron Bars made from selected material are quoted at 1.50c. to 1.75c. at mill.

Ferromanganese.—Prices are unchanged, and we quote 80 per cent. Ferro at \$62.50 in carload lots, delivered at buyer's mill.

Sheets.—The Sheet trade continues active, and considering the lateness of the season demand is exceptionally large. Several of the leading Sheet mills have advised us that the greater part of their output for first quarter is under contract. Prices are firm, and we quote No. 27 Black Sheets, one pass through cold rolls, at 2.85c. to 2.90c.; No. 28, 2.90c. to 2.95c.; Galvanized Sheets are firm, and are quoted at 70, 10 and 5 per cent. in carload lots, f.o.b. mill.

Steel Rails.—No contracts of importance have recently been placed. As noted last week, several roads that have not yet covered their requirements expect to

come into the market early in the new year. We quote at \$26 at mill for Standard Sections.

Merchant Steel.—There is only a moderate volume of business, the mills running mostly on old contracts, specifications on which are coming forward very freely. We quote: Plow Slabs, $\frac{1}{4}$ -inch and heavier, at 1.60c., base; Tire Steel, 1.35c. to 1.40c.; Toe Calk, 1.70c. to 1.75c.; Open Hearth Machinery, 2c., base; Open Hearth Spring, 2c., base; Hammered Lay Steel, 3c. to 3.25c.; Rolled Lay Steel, 2.75c. to 3c.; Cold Rolled Shafting, 57 per cent. off in carload lots; 52 per cent. in less than carload lots, delivered in base territory. Tool Steel, 7c. and upward, according to quality. On Tool Steel freight is allowed east of the Mississippi River. Terms are 30 days net, except Tool Steel, on which 60 days are allowed, less 2 per cent. off for cash in 10 days.

Skelp.—There is an active demand for Grooved Iron Skelp, and sales of round lots have been made in this market on the basis of 1.55c., f.o.b. Pittsburgh. There is also a good demand for Sheared Iron Skelp. We quote Grooved Iron Skelp at 1.55c. and Sheared at 1.60c. Steel Skelp is quiet, and we quote Grooved at 1.35c. and Sheared at 1.40c., f.o.b. Pittsburgh; terms four months, or 2 per cent. off for cash in 30 days.

Merchant Pipe.—A shortage in supply and tardy deliveries on certain sizes of Tubular goods are reported. However, mills are making better deliveries than for some time. Prices are firm, with the exception of Steel Boiler Tubes, on which there is some cutting being done for good orders. Prices to consumers are as follows:

Merchant Pipe.		
	Black. Per cent.	Galvd. Per cent.
$\frac{1}{8}$ to $\frac{1}{2}$ inch and 11 to 12 inch.....	61	48
$\frac{3}{4}$ to 10 inch.....	68½	56
Casing, Random Lengths.		
	S. & S.	I. J.
2 to 3 inch.....	58	53½
3½ to 4 inch.....	63	59
4½ to 12½ inch.....	65	61½
Casing, Cut Lengths.		
	S. & S.	I. J.
2 to 3 inch.....	53½	49
3½ to 4 inch.....	59	55
4½ to 12½ inch.....	61½	57½
Boiler Tubes.		
		Up to 22 feet. Per cent.
Steel.		
1 inch to 1½ inch and 2½ inch.....		55
1½ inch to 2½ inch.....		51
2½ inch to 13 inch.....		62
Iron.		
1 inch to 1½ inch and 2½ inch.....		49½
1½ inch to 2½ inch.....		45
2½ inch to 13 inch.....		57

It should be noted that jobbers are quoted 5 per cent. or more lower than the above prices.

Iron and Steel Scrap.—The market is quiet, consumers holding off placing orders until after the first of the year. Nominal prices are as follows: No. 1 Railroad Wrought Scrap at \$14 to \$14.50 net ton; Old Iron Rails, \$19.50 to \$20 gross ton; Old Steel Rails, \$15 to \$15.50; No. 1 Tank and Pipe Scrap, cut, \$10.50 to \$11 net ton; Turnings, \$6.50 to \$7; Cast Iron Borings, \$5 to \$5.50; Low Phosphorus Melting Stock, \$14.50 to \$15; Soft Busheling Scrap, \$10.50 to \$11; Old Horseshoes, \$12 net ton.

Birmingham.

BIRMINGHAM, ALA., December 23, 1900.

This is the season of the year when the Iron market is quiet, as a rule, and remains so until the holidays have passed. But this year has proved an exception to the rule. While the past week lacked the snap that characterized the weeks immediately preceding, in the way of buying, still there has been a good trade without any recession in prices. The market has been particularly good for Foundry grades of Iron and sales have been fair. Some interests are practically out of the market for these grades for the next 60 days. No. 2 Foundry has been advanced to \$11.25, and has held to that figure. There have been individual cases where the price obtained has been greater. So that the quotation given can be taken as inside price. With this as a basis, we have \$10.75 for No. 3 Foundry and \$10.25 for Gray Forge. Basic Iron has sold around \$10.50. Shipments have been free—and in some cases have been deterred by lack of cars. One can say that in this respect there is all the activity that facilities will permit. There is

a disposition to feed the demand without advancing the price, and to work for a steady market. But there is not much of a desire to spread the deliveries far into 1901.

Reports in circulation concerning certain changes in the personnel of the management of some of our corporations here can neither be confirmed nor denied. The mouths of the parties concerned are padlocked, and they are pursuing a policy of silence. But there is a feeling "all the same" that some important changes are pending. The reports current concerning the absorption of the Alabama Steel & Wire Company by the American Steel & Wire Company are officially denied here, and your correspondent has primal authority for saying that not only has no proposition been made to purchase, but if it was made it would not be considered. In other words, the plant is not for sale. Their business has so increased that they will run double turn, and the Steel mill has been notified to increase its delivery of Steel. So that rumor can be considered as "run to earth." All these rumors concerning affairs here have had their origin in Wall Street, and may have had for their object an influence on the various stocks concerned. Be that as it may, they have ceased to be regarded here as anything but idle rumors.

The same importunate demand for prompt shipment of new business prevails, and it looks as if we are going into the new year with stocks at low ebb and demand at high tide. Some interesting facts are given out in connection with the Steel mill. They now have six furnaces in operation and are preparing the seventh. In a short time the eighth will follow and the ninth and tenth. They are turning down orders every week, simply because of inability to meet the demand. A Steel mill runs on orders and does not pile up stock as a furnace does. The orders have been so free and so importunate that it has been a question with the management as to satisfying them. In many cases it has been simply impossible. This demand for Steel is mainly from the domestic trade, though there is a smart sprinkle from foreign sources. It is safe to say that it would take another mill of equal capacity with the one in operation now to fill the demand. In this connection it may not be out of place to say that plans are already drawn for another Steel mill which is in contemplation. While its erection is not yet an assured fact, strong people are behind the scheme with ample funds to finance it. With a favorable financial statement of affairs on January 1 it is a great probability that we will have another Richmond in the field in furnace building, adding considerably to existing capacity. But as a rule these things "depend" on certain other things known only to the projectors, and it is unsafe to announce their advent until operations have commenced. But all the indications at the present time favor the assertion that the present furnace capacity will be added to, and that the present Steel mill will be supplemented by at least two others on which preliminary operations will be commenced before the summer of 1901. One could only be willfully blind or willfully ignorant of what is transpiring who fails to comprehend that we are on the eve of the greatest industrial development that Birmingham has ever known. And it is not based on wind. It is solid. The export demand for Iron is quiet, but the shipments for export are good, aggregating about 30,000 tons for each October and November.

Negotiations of which your correspondent has been aware have been pending for some time, looking to the removal of the Southern Car Works to this locality. This means the transfer of the works at Memphis as well as those at Gadsden; and it means an addition to the ranks of labor here of at least 1000 men. The site selected is at Ensley, and the removal is an established fact. This will be an added feeder to the Steel mill, for Steel cars will be made, and Pittsburgh will have a competitor in that branch of Iron industry. It will take time to remove and re-establish such an important enterprise, but arrangements are perfected to expedite the change as quickly as possible. It is by no means certain that the Rogers Locomotive Works at Paterson, N. J., will not follow suit and come to Ensley. Negotiations concerning that removal have been "on and off" for some time past, and they are not yet definitely concluded. Besides these important enterprises there are others with serious thoughts turned to this locality, but whose conclusions do not yet justify any assertions as to their intentions.

There has been going on a detailed and careful investigation of certain Ore and Coal properties, and propositions for their opening and development are being considered. The probabilities are that conclusions will be reached, bringing into the field of production new, large and valuable properties. The available and valuable properties in this line are being circumscribed every week, and local talent has lately been commissioned to round up and "corral" much of this kind of property.

Foreign capital has had, and has now, representatives in the district looking for investments that promise prof-

its or dividends, and it is not drawing a whit on the imagination to say that if the January financial statement should be favorable this district will have more capital invested in its development than ever before in its history. To the notice of your correspondent has come the sale of a marble quarry, a valuable Coal property, while he knows of very valuable Ore properties being investigated with a certainty of sale if they pan out satisfactorily. It looks now as if the year 1901 will be a banner year in the history of Birmingham.

Metal Market.

Office of *The Iron Age*, 232-238 William street, }
New York, December 26, 1900.

There were practically but two business days in the week under review—Thursday and Friday last. This was because the London Exchange closed down on Friday evening and will not reopen until to-morrow morning. On Friday last our market was brought to a standstill and until this writing the only effort made in the direction of business was made to-day. It was very weak, however, as no one showed any inclination toward buying until they could get a clearer conception of the market, and buyers showed no disposition toward offering in absence of the London quotations. Prices, therefore, since Friday have been entirely nominal and business was practically nil.

Pig Tin.—Influenced by rising London quotations, this market has also shown advancing tendencies. On Thursday the market advanced to 26c. and Friday added another ½c. to the figure. Thursday's London price went up to £116 5s. and on Friday the quotation soared £2, touching £118 5s. at the close. While there have been no official quotations from London since that day, certain merchants in this city have received private advices to the effect that the prices at which private transactions have gone through in London on Saturday and Monday were considerably higher. It should be borne in mind, however, that these figures are cabled through private channels and are entirely unofficial. The figures, it is said, are at an advance of £3 to £4 above Friday's official quotation. A nominal quotation of 28c. was mentioned as being about the representative figure of the market here to-day.

Copper.—In all quarters of the trade it is reported that there is no change in the quotable price. In the same breath it is also stated that only the smallest dribbles of business have been anywhere in sight throughout the whole week. Quotations are consequently nominal, and although Lake is still quoted at 17c. and Electrolytic and Casting 16½c., it is not entirely improbable that the metal could be had a shade lower if a bid were made. One broker said, "I'd hate to make a bid of 16½c. unless I knew exactly where I could place my copper, for I think they'd take it up quickly." There hasn't really been enough business transacted to fathom the market. On Friday the London market closed a fraction higher than the price named a week ago to-day, with £71 18s. 9d. for spot.

Pig Lead.—Business is exceedingly slight and prices are unchanged. Consumers in all branches are holding off and the situation is most uninteresting as far as sales are concerned. The American Smelting & Refining Company are still quoting 4.37½c. for Desilverized lots of 50 tons and more, f.o.b. New York, and 4.32½c., St. Louis. In London the price was unchanged and Friday last £16 2s. 6d. was quoted. Official announcement has been made of the action of the directors of the American Smelting & Refining Company last week in recommending an increase in the capital stock of the company of \$35,000,000. This will increase the stock from \$65,000,000 to \$100,000,000. The purpose of this will readily be recognized. It is for the absorption of the Guggenheim interests. It will be necessary for the stockholders to ratify the action of the directors and a meeting for this purpose will be called at the pleasure of the president, E. W. Nash. An officer of the company stated that this meeting might be held before the close of the year and might not be held for a month or two. The advent of these new interests into the Smelting Company will occasion a change in the

directorship. It is stated in the trade that it is the Lewisohn interests that will be supplanted. This, it is said, has been occasioned by the stand taken by the Guggenheims regarding the sale of the product of the consolidated company. Heretofore the United Metals Selling Company have been handling the silver, gold and copper produced by the American Smelting & Refining Company. The reorganized Smelting Company it is said will conduct this branch of their sales department themselves just as they now dispose of their lead product direct to the consumers. No official information can be obtained regarding this part of the affair. An officer stated to a representative of *The Iron Age* to-day that he could see no reason why the price of lead should change during the next few months although the present price has not been set for any definite period.

Spelter.—The market is very weak. Demand is light, and there is no interest whatever in the situation. Prices quoted here range from 4.15c. to 4.20c. The London market quoted the lowest figure for the year last Friday, when £18 10s. was named.

Antimony.—There is no change, Hallett's being quoted 9¼c. and Cookson's 10½c.

Nickel.—Is without change, and prices are nominally 55c. to 60c. for small lots. Large lots cannot be obtained.

Quicksilver.—Is unchanged. Prices quoted here are \$51 per flask of 76½ lbs. in lots of 50 flasks and more. The London market is unchanged at £9 2s. 6d.

Tin Plate.—An excellent demand is reported at unchanged prices. The American Tin Plate Company are still quoting on a basis of \$4.19 per box of Standard 100-lb. Cokes, f.o.b. New York, and \$4 f.o.b. mill. These are the prices which the company named for the balance of this year and the first quarter of 1901.

The launching recently of the big four-masted steel sailing ship "Astral" from the Arthur Sewall Company's yards, at Bath, Maine, was a notable event in that the "Astral" is the largest sailing vessel afloat, and, moreover, she is the one-hundredth craft launched by the Sewalls since the family began shipbuilding in 1823. The "Astral" will be the first of the Standard Oil Company's new fleet of American built sailing ships. She will ply between New York, Japan and China, carrying oil to Oriental ports and returning with hemp and sugar. She is 332 feet long, 45.3 feet beam, 26 feet depth of hold, with a gross tonnage of 3206, and a carrying capacity of 1,500,000 gallons of oil.

President Gompers of the American Federation of Labor, in his annual report presented recently, points out that although a considerable number of strikes have occurred in this country during the year, they were not of a defensive character, but were rather for higher wages and a shorter workday. During the year 688 strikes were reported, involving 213,190 persons. Of this number 455 were successful, and 106 unsuccessful; 74 were compromised, and 53 are still pending. Of the workers affected by the strikes 217,493 persons are said to have been directly benefited in the result, while 11,257 were involved in loss.

Professor Slaby of the Technische Hochschule of Berlin lectured on Saturday night in that city in the presence of Emperor William upon his system of multiplex wireless telegraphy, and made experiments showing the reception of messages from Charlottenburg, 2 miles west, and Schoeneweide, 8 miles east, of Berlin, simultaneously. These messages were caught on the same lightning rod. Professor Slaby stated that the same receiving wire would serve for an indefinite number of messages coming simultaneously, while excluding all electric currents that were not wanted.

A careful approximation of the total yield of gold from the Klondike and Nome for the present year has been completed by the Selby Smelting Company, acting with the statistician of the San Francisco Mint. The amount is \$25,724,223.31, divided as follows: Klondike, \$21,358,329.17; Nome, \$4,365,894.64.

QUOTATIONS OF IRON STOCKS DURING THE WEEK ENDING DECEMBER 26, 1900.

Cap'l Issued.		Thursday.	Friday.	Saturday.	Monday.	Tuesday.	Wednesday.	Sales.
\$29,000,000	Am. Car & Foundry, Common.....	22 1/4-22 3/4	22 -22 1/4	22 -22 1/4	.....	.....	22 1/4-22 1/2	10,700
29,000,000	Am. Car & Foundry, Pref. (7% Non-Cu.)	71 1/4-72	70 1/4-71	70 1/4-71 1/4	.....	.....	70 1/4-71 1/4	9,700
19,000,000	Am. Steel Hoop, Common.....	31 -31 1/2	30 1/2-31 1/4	30 1/2-32 1/4	.....	.....	31 1/2-32 1/4	7,500
14,000,000	Ah. Steel Hoop, Pref. (7% Cu.).....	-77	.....	70 1/2-77	.....	.....	77 -78	1,700
50,000,000	Am. S. & W., Common.....	43 -43 1/2	43 1/4-44 1/4	43 1/4-43 1/2	.....	.....	43 1/4-45 1/4	40,900
40,000,000	Am. S. & W., Pref. (7% Cu.).....	87 -87 1/4	87 1/4-88	87 1/4-87 1/2	.....	.....	87 1/4-87 1/2	4,700
28,000,000	Am. Tin Plate, Common, N. Y.....	52 1/4-54	53 -53 1/4	53 1/4-54	.....	.....	54 1/2-56 1/2	33,100
18,325,000	Am. Tin Plate, Pref., N. Y. (7% Cu.)..	-90	.....	.....	.....	.....	-90 1/2	1,500
7,500,000	Bethlehem Iron.....	.....	-59	.....	.....	.....	.....	50
15,000,000	Bethlehem Steel, Par \$50, \$1 paid in..	-18	.....	.....	.....	.....	-18	1,000
7,974,550	Cambria Iron, Philadelphia*.....	-45	-45 1/4	.....	.....	.....	-45 1/2	169
16,000,000	Cambria Steel**.....	20 -20 1/2	19 1/2-20 1/4	20 -20 1/4	.....	.....	20 1/4-20 1/2	11,618
11,000,000	Colorado Fuel & Iron.....	53 1/4-54 1/2	53 1/4-53 1/2	53 1/4-55 1/4	.....	.....	54 1/4-56 1/4	18,518
46,484,300	Federal Steel, Common.....	53 1/4-54	53 1/4-54 1/4	53 1/4-55 1/2	.....	.....	55 1/4-57 1/2	115,000
53,253,500	Federal Steel, Pref (6% Non-Cu.).....	78 1/2-79	78 1/2-78 3/4	78 1/2-79 1/2	.....	.....	77 1/2-78 1/4	10,600
32,000,000	National Steel, Common, N. Y.....	39 -40 1/4	38 1/4-40	40 1/4-41	.....	.....	40 1/4-41 1/2	29,100
27,000,000	National Steel, Pref., N. Y. (7% Cu.)..	.....	-93	-92 1/4	.....	.....	92 -92 1/4	1,200
40,000,000	National Tube, Common, N. Y.....	62 -62 1/4	-62	62 -63 1/2	.....	.....	63 1/4-65	15,000
40,000,000	National Tube, Pref., N. Y. (7% Cu.)..	103 1/4-103 1/2	-103 1/2	-103 1/2	.....	.....	-104	1,500
5,000,000	Penna., Common, Philadelphia.....	75 -76	.....	.....	.....	.....	77 -80	25
1,500,000	Penna., Pref., Philadelphia.....	-95	.....	-95	.....	.....	96 -99	98
12,500,000	Pressed Steel, Common.....	-51	.....	50 1/2-50 3/4	.....	.....	50 1/2-51	1,300
12,500,000	Pressed Steel, Pref. (7% Non-Cu.).....	82 1/4-82 1/2	-82	-83	.....	.....	82 1/4-83 1/2	1,400
27,191,000	Republic Iron & Steel, Common.....	16 1/4-16 1/2	16 -16 1/4	16 -17	.....	.....	16 -16 1/4	6,800
20,306,900	Repub. Iron & Steel, Pref. (7% Cu.)..	63 1/4-64	62 1/4-63 1/2	62 1/4-64	.....	.....	63 -64 1/4	4,400
7,500,000	Sloss-Sheffield S. & I., Common.....	-24	23 -24	24 -24 1/4	.....	.....	.....	1,000
6,700,000	Sloss-Sheffield S. & I., Pref. (7% Non-Cu.)	69 -69 1/2	-69	.....	.....	.....	.....	500
20,000,000	Tennessee Coal & Iron.....	63 1/4-64 1/4	61 1/4-64 1/2	64 -64 1/4	.....	.....	65 1/2-69 1/2	35,300
1,500,000	Warwick Iron & Steel (par \$10).....	-8	-8	.....	.....	.....	.....	785
15,000,000	International Pump, Common.....	28 1/2-29 1/2	28 1/2-29 1/4	.....	.....	.....	29 -29 1/2	2,500
12,500,000	International Pump, Preferred.....	.....	.....	.....	.....	.....	.....	.....
11,000,000	International Silver.....	.....	.....	.....	.....	.....	.....	.....

* Par \$50. ** \$10.50 per share paid in. † 6% guaranteed by Beth. Steel Co. Late Philadelphia sales by telegraph. ‡ Ex-dividend.

Bonded indebtedness: Am. S. & W., \$130,656; Am. Tin Plate, none; Am. Steel Hoop, none; Cambria Iron Co., \$2,000,000 6% debenture 30-year bonds, 1917, payable option 5 years, assumed by Cambria Steel Co.; Federal Steel Co., \$9,822,000 Illinois 5%, \$7,417,000 E. J. E. R. 5%, \$1,600,000 Johnson 6%, \$6,732,000 D. & I. R. R. 5%, \$1,000,000 2d D. & I. R. R. 6%, \$10,000 land grant D. & I. R. R. 5%; National Steel, \$2,561,000 6%; National Tube, none; Tennessee C. I. & R. Co., \$8,367,000 6%, \$1,114,000 7%, \$1,000,000 7% cu. pref.; Pennsylvania Steel, \$1,000,000 5%, Steelton, 1st, 1917, \$2,000,000 5%; Sparrow's Point, 1st, 1922, \$4,000,000, consolidated, both plants; Bethlehem Iron, \$1,351,000 5% maturing 1907. Interest and principal guaranteed by Bethlehem Steel Co. Republic Iron & Steel, none; Warwick Iron & Steel, none; Colorado Fuel & Iron Co.; Col. Fuel Co. Gen. Mort. 6% \$880,000, Col. Coal & Iron Con. Mort. 6% \$2,810,000, Col. Fuel & Iron Gen. Mort. 5% \$2,308,000. Also outstanding \$2,000,000 preferred stock on which dividends have been paid to June 30, 1900. Sloss-Sheffield St. & I. Co., Sloss I. & S. first mortgage 6%, \$2,000,000, Sloss I. & S. general mortgage 4 1/2% \$1,835,000.

Iron and Industrial Stocks.

Considering the fact that the week under review was a short one, there has been considerable activity. In this Federal Steel led, the sales aggregating 115,000 shares. The stock advanced from 53 1/2 to 57 1/2 during the week. Among the other stocks which recorded advances are Steel Hoop, Steel & Wire, Tin Plate, which reached 56 1/2, Colorado Fuel & Iron, National Steel, National Tube and Tennessee Coal & Iron. To-day the market was excited, rising all along the line.

	Bid.	Asked.
American Bicycle Company, common.....	6 1/2	7
American Bicycle Company preferred.....	28	29 1/2
American Bicycle Company, bonds.....	73	75
E. W. Bliss, common.....	125	137 1/2
E. W. Bliss, preferred.....	75	80
Cramp's Shipyard stock.....	3 1/2	4 1/4
Diamond State Steel.....	4	10
Empire Iron & Steel, common.....	44	48
Empire Iron & Steel, preferred.....	17 1/2	19
National Enam. & St., common.....	80	84
National Enam. & St., preferred.....	4 1/4	5
New Haven.....	27	28
Otis Elevator, common.....	85	87
Otis Elevator, preferred.....	3 1/2	5
Pratt & Whitney, common.....	45	55
Pratt & Whitney, preferred.....	8 1/2	8 3/4
Tidewater Steel.....	5 1/4	5 1/2
U. S. Cast Iron Pipe Company, common.....	30	32
U. S. Cast Iron Pipe Company, preferred.....	100	110
U. S. Projectile.....	110	115
H. R. Worthington, preferred.....	45 1/2	45 3/4
American Bridge Company, common.....	95	95 1/2
American Bridge Company, preferred.....	22	22 1/2
Crucible Steel, common.....	79	81
Crucible Steel, preferred.....	.....	.....

Dividends.—The American Stoker Company have declared a quarterly dividend of 2 per cent. on the preferred stock, payable January 15. Books close December 24; reopen January 17.

The General Electric Company have declared the regular semi-annual dividend of 3 1/2 per cent. on their preferred stock, payable January 31 to stock of record January 15.

The Ashton Valve Company have declared an extra dividend of 1 per cent.

A New Open Hearth Steel Plant.—The Crucible Steel Company of America will build a new open hearth steel

plant in the vicinity of Pittsburgh, which is to consist of 12 50-ton furnaces. A blooming mill and a continuous mill for small sizes of billets is also to be put down.

The Non-Corrosive Metal Company, 37-39 Pitts street, Boston, are manufacturing new process nickel steel, which, their circular states, is an alloy (the important parts of which are nickel and steel) invented and perfected by this company after years of experimental work. It is claimed that its tensile strength in castings is 40,000 pounds and upward to the square inch and in rolled rods 100,000 pounds. In color it is silver and it grinds and polishes to a high finish, brazes well and takes the tool about the same as Bessemer steel. The circular further states that it resists acids and chemicals, will neither rust nor blacken and requires no plating. At present the metal is being introduced to the carriage trade in the form of metal trimmings, but its use in other lines is growing.

The report that the Budke Mfg. Company of Pittsburgh, makers of sheet iron goods, with works at Canonsburg, Pa., would remove their plant to Parkersburg, W. Va., is untrue.

The blast furnace of the Youngstown Steel Company, at Youngstown, will blow in this week. The product is washed metal.

According to the *Bulletin* of the New York State Labor Bureau for the quarter ended September 30, 1900, labor was more generally employed in that quarter than during the previous three months. The number of unionists idle on October 1 was 31,460, as compared with 49,382 on July 1, 1900. The idleness was confined to three industries: Cigar making, in which there was a strike; clothing, in which the third quarter of the year is normally dull, and construction work. All other industries were fully employed.

John D. Rockefeller has made another gift of \$1,500,000 to the University of Chicago, \$1,000,000 of which are to be used as an endowment fund.

The Philippine Tariff.

WASHINGTON, D. C., December 24, 1900.—The Secretary of War has made public the draft of a new tariff for the Philippine Islands, which has been prepared by a special board of officers recently convened at Manila. In making the new schedules public the officials of the War Department state that a reasonable length of time will be allowed interested persons in the United States and in the Philippines to examine rates and classifications and that representations made to the Department in writing will receive due consideration before this tentative tariff is officially promulgated.

Accompanying the schedules is a general statement prepared by the board in which an explanation is presented of the chief considerations that have convinced the board of the desirability of the proposed changes. The new tariff is largely specific and has been so arranged because importers in the Philippines are said to have grown accustomed to the levying of duties without reference to the real market values of merchandise. In discussing the character of the changes proposed in the new tariff the board says:

"In iron and steel the duties have been increased upon the articles that have been heretofore imported in any quantity. Upon the heavier articles, such as structural and railroad iron, the duties have been materially decreased to encourage importations where practically none have been had and to aid in the development of the islands.

"In copper and its alloys the duties have been materially decreased upon wires and electrical supplies, as well as upon sheathing for vessels, in pursuance of the policy to encourage wherever possible the advancement of the islands by placing low duties upon the instruments of commerce.

"Other forms of this metal and its alloys have increased duties placed upon them.

"The duties upon tin, zinc, lead and other metals have been slightly increased, except in their crude forms, where they have been correspondingly reduced to encourage native craftsmen.

"In machinery and apparatus the board has placed agricultural machinery upon the free list and affixed a low ad valorem duty upon other heavy forms; the result should be large importations where previously lacking and the development of the islands, with accompanying increase in customs receipts.

"In providing for the free import, for a term of six years, of railroad equipment and machinery, the board has had before it a similar provision of the Cuban tariff, but has lengthened the term over that therein established on account of the unsettled conditions here prevailing and the great distance separating the archipelago from the centers of the industry and capital. It has broadened, too, the scope of excepted articles over the Cuban provision to include many not therein provided for, but which, it is believed, should receive the same encouragement as is accorded to railroads and their accessories.

"The metric system of weights and measures has been retained. Although the board has differed on the question of retaining the peso as the monetary unit in the computation of customs duties and charges, a majority of its members decided in favor of so doing, and the duties have accordingly been expressed therein. These have in every case been arrived at upon a basis of 2 pesos being equal to 1 American dollar; and if in the judgment of those in authority the business of the islands can be best administered with the monetary system of the United States as the basis of all transactions and computations, the present charges divided by two will give in American currency the exact duties which the board has adopted in each case."

Following are the metal schedules of the new tariff:

Class 1.—Stones, Earths, and Minerals. GROUP 5.—ORES.

41. Ores, including all ores from which the mineral has not been extracted, 1000 kg. 60.00
- Class 2.—Metals and All Manufactures in Which a Metal Enters as a Principal Element.

GROUP 2.—IRON AND STEEL.

66. Steel and iron in pigs, and old scrap iron, 100 kg. 20

67. Cast iron in columns, without being finished or polished, 100 kg. 20
68. Cast iron pipe of all dimensions for conducting fluids, to include bends, joints, &c., ventilating pipes and air ducts, and cast iron fittings for same, 100 kg. 25
69. Cast iron in common manufactures, including fencing, gates, plates, &c., not polished or combined with other metals or materials, 100 kg. 75
70. Cast iron fittings, japanned, lacquered or varnished, for carriages, house trimmings, carpenters' and cabinet makers' trimmings, and generally all cast iron fittings not elsewhere specially provided for, 100 kg. 2.30
71. Cast iron stoves, whether decorated, polished or not, and similar forms, with connections and fittings for the same, 100 kg. 75
72. Cast iron in common manufactures not elsewhere specially provided for, 100 kg. 1.00
73. Cast iron hollow ware in utensils, galvanized, tinned or not, but not enameled or coated with porcelain, including cooking utensils, household furniture, &c., 100 kg. 2.21
74. Cast iron in fine manufactures—i. e., those polished, enameled with a coating of porcelain or with ornaments of other metals—100 kg. 5.00
- Articles of malleable cast iron shall pay the duties stipulated for manufactures and articles of wrought iron.
75. Wrought iron or steel in bars, rods and plates, and in such forms as are not made up into articles, 100 kg. 1.00
76. Wrought iron and steel rails for railways, tramways, switches, &c., 100 kg. 75
77. Wrought iron and steel, in hoops and wheels, up to 100 kg. in weight, 100 kg. 1.50
78. Wrought iron and steel in structural iron, including angles, T's, joists, beams and generally all iron and steel for structural purposes, whether for buildings, wharves, bridges, culverts, tanks, &c., 100 kg. 1.00
79. Wrought iron and steel boilers of all kinds, whether for vessels or stationary plant, including boilers for locomotives, 100 kg. 1.75
80. Vessels with iron or steel hull and of mixed construction, of any capacity, per register ton. 5.00
81. Wrought iron or steel pipe, of all dimensions, whether galvanized, coated or not, for conducting fluids, to include ventilating pipes and air ducts, with fittings for the same, 100 kg. 1.50
82. Wrought iron or steel in anchors, chains, axles, tires for wheels, springs for carriages of all kinds, to include heavy pieces for ships' equipment, 100 kg. 1.75
83. Wrought iron or steel fittings, japanned, lacquered or varnished, for carriages, house trimmings, and generally all other wrought iron or steel manufactures not elsewhere specially provided for, 100 kg. 4.50
84. Wrought iron or steel ware, polished, enameled or with ornaments of other metals, 100 kg. 10.00
85. Sheet iron, whether galvanized, corrugated or not, for building purposes, not manufactured into any form, 100 kg. 1.50
86. Sheet iron hollow ware, whether galvanized, lacquered or not, including coal hods, buckets, stove and other pipe, and generally all articles manufactured of sheet iron, 100 kg. 6.00
87. Iron or steel wire, single or twisted, not more than three strands, galvanized or not, not made up into any form, 100 kg. 2.70
88. Wire rope or cable, whether galvanized or not, 100 kg. 1.50
- Only round iron, the thickness of which does not exceed No. 1—i. e., 8 mm. in diameter—shall be considered as wire.
89. Common manufactures of wrought iron, including horseshoes, screws, nails, bolts, rivets, &c., 100 kg. 1.90
90. Iron or steel wire gauze, not further manufactured, over 15 threads to square inch, 100 kg. 13
91. Iron or steel wire screening, not further manufactured, under 15 threads to square inch, 100 kg. 4.50
92. Agricultural implements and tools, composed wholly or in greater part of iron or steel, 100 kg. 1.00
93. Tools and implements of trade, industry or art, made wholly or in greater part of iron or steel, 100 kg. 10.00
94. Needles, pins, pens, parts of clock work and other similar manufactures, kilogram. 2.20
95. Knives, carvers, razors, penknives, scissors and surgical and dental instruments, kilogram. 56
96. Side arms and detached pieces for same, kilogram. 10.00
97. Shotguns, barrels and detached pieces for same, kilogram. 12.00

GROUP 3.—COPPER AND ITS ALLOYS.

98. Copper cement or cement for any of the alloys of copper, 100 kg. 6.00
99. Copper of first fusion, old copper and brass, also copper, brass or bronze in pigs, or any rough form not worked, 100 kg. 4.25
100. Copper, brass or bronze in sheets or plates, not for sheathing vessels, 100 kg. 10.00
101. Copper sheathing or yellow metal for sheathing vessels, 100 kg. 7.00
102. Copper, brass or bronze in bars, including bars of other metal covered with sheathing of any kind of those metals, 100 kg. 8.00
103. Copper wire, insulated, 100 kg. 5.00
104. Copper, brass or bronze wire, not insulated, 100 kg. 14.00

105. Copper, brass or bronze tubes and pipes, and fittings for the same, whether planished or not, to include tubes or pipes covered with sheathing of any of these metals, 100 kg.....	15.00
106. Castings of copper, brass or bronze not elsewhere specially provided for, 100 kg.....	20.00
107. Copper or brass wire gauze or netting, up to 100 threads to the square inch, 100 kg.....	20.85
108. Copper or brass wire gauze or netting, over 100 threads to the square inch, 100 kg.....	30.00
109. Copper, brass or bronze hollow or flat ware, whether cast, pressed, rolled or stamped, including utensils, lamps, basins, trays, picture frames, &c., kilogram.....	.34
110. Copper, brass or bronze nails, tacks, spikes, bolts, rivets and burrs, buckles, and nails, with metal heads, kilogram.....	.40
111. Copper, brass or bronze hardware, including locks, hinges, knobs, bolts, hooks, and generally all articles of these metals used in the trade, kilogram.....	.40
112. Copper, brass or bronze jewelry and small articles of luxury, kilogram.....	1.00
113. Articles manufactured of copper, brass or bronze, not elsewhere specially provided for, kilogram.....	.50
114. Small figures of copper, brass or bronze, including statuettes, which are works of art, kilogram.....	1.50
115. Statuary and large pieces of copper, brass or bronze, cast or wrought into works of art, including fountains and all large ornamental forms, 100 kg.....	150.00
116. Memorial and mortuary tablets of copper, brass or bronze, 100 kg.....	160.00
117. Copper, brass or bronze plates engraved for printing, kilogram.....	2.00
118. Bells and chimes of copper, brass or bronze, or alloys of the same, weighing over 2 kg. each, 100 kg.....	100.00
119. Copper or brass powder, kilogram.....	.50
120. Articles of copper, brass or bronze, nickeled, kilogram.....	1.10

GROUP 4.—OTHER METALS.

121. Lead in pigs, bars and old lead, 100 kg.....	3.00
122. Lead pipe, brackets, &c., for plumbing, also solder and babbitt metal, 100 kg.....	5.00
123. Lead manufactures not otherwise specially provided for, 100 kg.....	10.00
124. Type for use in printing, kilogram.....	.10
125. Tin in ingots, 100 kg.....	3.00
126. Zinc in lumps, bars or pigs, 100 kg.....	2.00
127. Zinc in sheets, nails and wire, 100 kg.....	5.00
128. Zinc in manufactured articles, even varnished, 100 kg.....	11.00
129. Tin plate, unworked, 100 kg.....	6.17
130. Tin plate manufactures, 100 kg.....	12.00
131. All other metals and alloys, not elsewhere specially provided for, in sheets, lumps, nails, tubes, &c., 100 kg.....	7.25
132. The same metals manufactured, varnished or not, 100 kg.....	13.00
133. The same metals and zinc in nickeled wares, kilogram.....	1.10

Class 13.—Instruments, Machinery and Apparatus.

GROUP 2.—APPARATUS AND MACHINES.

462. Portable boilers mounted on wheels, to be moved by horse-power or automatically, 100 kg.....	2.47
463. Sewing machines, 100 kg.....	6.75
464. Typewriting machines, kilogram.....	.65
465. Bicycles and tricycles, kilogram.....	.60
466. Bicycle and typewriter fittings and sundries, including lamps, but not tires, kilogram.....	2.00
467. Automatic slot machines of all kinds, each.....	5.00
468. Photographic instruments, complete, small, to be used with tripod, each.....	1.00
469. Photographic instruments, complete, large, to be used with tripod, each.....	2.00
470. Platform scales and weights, including counter scales having platforms and steelyards, 100 kg.....	7.50
471. Balance and spring scales, with weights and scoops, kilogram.....	.50
472. Dynamos, electric and other motors, not elsewhere specially provided for, 100 kg.....	6.00
473. All other electrical machinery and appliances used for lighting, motor and traction purposes, not otherwise specified, including lamps, switches, fuse wire and the like, 100 kg.....	15.00
474. Telephone transmitters and receivers, each.....	2.00
475. Milling machinery, printing presses, and machines and parts of machines employed in arts and industries, not elsewhere specially provided for, per cent ad valorem.....	15
476. Hoisting and mining machinery, transshipment cranes and hydraulic columns, per cent. ad valorem.....	15
477. Locomotive and traction engines of all kinds using steam or other power, per cent. ad valorem.....	15

GROUP 3.—CARRIAGES.

478. Automobile carriages and wagons of all kinds, each.....	50.00
479. Four-wheeled coaches and carriages, closed or open, with or without hoods, including omnibuses, each.....	40.00
480. Four-wheeled carriages, open or with canopy tops, with or without folding seats, such as surreys, dog-carts, buggies, each.....	25.00
481. Two-wheeled carriages, closed or open, with or without hoods and covers, each.....	20.00
482. Passenger carriages for railways and finished wooden parts for same, per cent. ad valorem.....	12
483. All other railway carriages, including box cars, flat cars, dump cars, &c., per cent. ad valorem.....	12

484. Passenger carriages for tramway and finished wooden parts for same, per cent. ad valorem.....	12
485. All other tramway carriages and wooden parts for same, per cent. ad valorem.....	12
486. Wagons carts and handcrafts, not intended to carry passengers, 100 kg.....	2.00

The following articles are free of duty:

622. Gold, silver and platinum in broken up jewelry, in bars, sheets, coins, dust and scrap.
623. Legitimate copper coins.
626. Agricultural machinery and apparatus.

The machines and apparatus mentioned in this number are those employed by farmers and agriculturists for preparing ground and gathering the crops; also those employed in order to clean the crops and improve them without essentially changing their nature.

635. Submarine telegraph cables.
636. Pumps intended for the salvage of vessels.
637. Parts of machinery, pieces of metal and wood imported for the repair of foreign vessels which have entered the ports of the Philippine Islands through stress of weather.
639. The following articles, when imported direct by a person or corporation residing or transacting business in the Philippine Islands for the exclusive use of such person or corporation within six years from the promulgation of this tariff shall be entitled to free entry under such conditions and guaranty as the collector of customs for the islands may exact or direct:

Passenger coaches, freight cars, electric motors, locomotives and tenders complete, erected or knocked down, including tracks, wheels, axles, locomotive boilers, tanks, and generally all forgings, fixtures and machinery therefor.

Turn tables, bridges, bridge work, steel rails, points, crossings, metal ties, and generally all structural iron and steel for building wharves, bridges, culverts, tanks and the like.

Sheet iron roofing or siding shall not be considered as within this number, but shall pay duty under No. 85.

W. L. C.

The Federal Bankruptcy Law.

WASHINGTON, D. C., December 24, 1900.—After a joint conference of the Judiciary Committees of the House and Senate, it has been formally decided to ratify the decision reached by Chairman Ray a fortnight ago and described in these dispatches—namely, not to attempt the amendment of the Federal bankruptcy act at the present session. A committee of the National Association of Referees, headed by Wm. H. Hotchkiss of Buffalo, started for Washington last week to urge prompt action on their pending bill, but turned back on the advice of Senator Hoar, who telegraphed that nothing could be done this winter.

Chairman Ray has explained very frankly the reasons which have induced him to recommend the postponement of the modification of the law, and while his action has been disappointing its basis is believed to be entirely sound. Mr. Ray agrees heartily with the referees that the present law needs strengthening in its involuntary features, and he is also anxious that the vexatious question as to the proper construction of Section 57 (g) relating to payments on account should be settled. So far as the latter proposition is concerned, however, the action of the United States Supreme Court in advancing a case involving this provision promises to result in an authoritative interpretation at the present term of the Court. While no one doubts the intent of Congress, yet the belief is strengthening that in employing the language used in the statute the framers of the law have made it impossible for the Court to hold in any other way than that payments on account within four months must be surrendered. If this is the decision of the Court, the House Judiciary Committee will provide an amendment excluding such payments from the category of preferences.

The action of the two committees in declining to go into the bankruptcy question at this session has been quite as much of a disappointment to those who desire the repeal of the statute as to those merely seeking to strengthen its involuntary features. The bill recently introduced by Senator McCumber of North Dakota providing for the repeal of the act has attracted very general attention, and has been privately printed and distributed broadcast throughout the country, presumably

by certain Western institutions now seeking the repeal of the law because of the fact that its practical operation has deprived them of large fees which they formerly received as trustees under the State insolvent laws. These interests had looked forward to an attempt to amend the existing statute as an excellent opportunity to bring about its repeal, and are therefore disappointed at the decision of the Judiciary Committee.

The National Association of Referees have laid before the Judiciary Committee a new bill drawn with even greater care than the measure which they submitted to Congress a year ago, and Chairman Ray will probably introduce it with a view to having it printed and widely circulated for criticism during the next ten months. The proposed amendments follow the lines of the original amendatory bill, but the provisions employed have been drafted with special reference to the more recent rulings of the courts.

W. L. C.

Lake Iron Ore Matters.

DULUTH, MINN., December 22, 1900.—The water shipments of the year have been 18,856,500 gross tons, to which must be added about 650,000 tons by all rail, making the total shipments of the year from mines and ports 19,506,500 tons. This is a comparison with estimates made in this correspondence last April of 20,000,000 and in June revised to 19,500,000 tons, which seems not to have been far out of the way.

The shipments by ports and ranges for the year have been as follows:

	Tons.
Two Harbors, Mesaba and Vermillion range.....	4,007,294
Duluth, Mesaba range.....	3,888,386
Escanaba, Menominee and Marquette ranges.....	3,660,919
Marquette, Marquette range.....	2,661,861
Ashland, Gogebic range.....	2,633,687
Superior, Mesaba range.....	1,522,899
Gladstone, Menominee range.....	418,854
Michipicoton, Michipicoton range.....	62,000
Total by water.....	18,856,500
Shipment by rail (estimated).....	650,000
Grand total.....	19,506,500

The movement by railways during the year has been somewhat interesting. The greatest tonnage was by the Chicago & Northwestern, that road reaching not only the Menominee range, but handling a larger volume of ore off the Gogebic than ever before, and very much more than the Wisconsin Central. Their total business, water and all rail shipments, has been nearly 6,000,000 tons, an enormous volume of one class of freight. The Duluth & Iron Range, shipping to one port, comes next with 4,007,000 tons. The Ishpeming & Lake Superior, owned by Ishpeming mining interests, has shipped the bulk of the Marquette product, 1,500,796 tons. The feature of interest in this connection is the advent of a new district and port, that of Michipicoton, with shipments of 62,000 tons.

Lending mines of the year have been as follows, and it is an interesting fact that the seven that shipped more than 750,000 tons each made a greater total than the entire region so recently as 1893. The seven are as follows:

	Tons.
Fayal, Mesaba range.....	1,252,950
Mountain Iron, Mesaba range.....	1,001,324
Chapin, Menominee range.....	925,565
Blwabik, Mesaba range.....	924,868
Mahoning, Mesaba range.....	911,000
Norrie, Gogebic range.....	906,667
Adams, Mesaba range.....	777,321

These seven mines have made a gross total of 6,700,000 tons, which is 640,000 tons more than the 82 mines of the district made in 1893.

There is a report that the Oliver Iron Mining Company are investigating the Cambria and Lillie mines, at Negaunee, with a view to purchase. There is probably about as much in this as in most of the rumors connecting this company with about everything on all the ranges. If the daily newspaper man had his way there would not be a mine on the lake the Oliver Company would not own in short order.

D. E. W.

The New York Machinery Market.

Office of *The Iron Age*, 232-238 William street,
New York, December 26, 1900.

It is the doings of a genuine holiday week which we have to chronicle in this issue, and we might devote considerably more space in telling the Christmas stories of the trade than in recording the actual business of the week. We might tell of the great and whole souled Liberty street machine tool merchant who happened to be telephoning an order for turkeys for his gardener and stable men and was instructing his cashier regarding his employees' presents, when a representative of *The Iron Age* called. We might tell of a number of other merchants who presented their employees with neat sums, and may, in fact, summarize it all by saying that everywhere a feeling of buoyancy and generosity seems to permeate the atmosphere. And what bearing has this on the business situation? It simply shows that the machinery trade is looking back on a year which turned out in no wise unsatisfactory and is looking forward to another year which promises from all present indications to afford no excuse for pessimism.

To say that this, Christmas week, was teeming with bustling activity in machinery business would indeed be regarded as a startling statement. For if there is any period of the year which is universally viewed by the trade as unfavourably "off," this is it. When this fact is considered the week under review stands out in most favorable comparison. This week has been a good one. Orders have come in in a nice, steady, though not heavy, volume. Inquiry has also been good, the letters in some instances asking particularly the promptness of delivery which can be made after the first of the year.

Business from the railroads is said to be keeping up well, and, aside from one or two large deals, the business is running more into promiscuous tools to be added here and there than in whole equipment. The Philadelphia & Reading deal has been closed. There will, of course, be odd purchases during the next few weeks, but the big lot for which a list of specifications were issued has been purchased. It is said that an excellent equipment was decided upon. The tools were principally of the heavier types, and all of the high-class builders of such tools and the large merchants came in for a goodly share. The tools, it will be recalled, are for the equipping of a new shop at Reading, Pa.

The shipbuilders who are in on the various craft for which the Navy Department have just received bids are looking about with a view of purchasing should the matter turn out favorably. While the recommendations have been made the shipbuilders will wait for signed contracts before they put into practice the plans which they have made. In some instances these are said to be of no mean proportions. Their caution is well grounded, too, for other recommendations have gone amiss at Washington. It will be interesting to see how the recommendations on the Rock Island Arsenal job turn out. Our last information from Washington was to the effect that they are now on Chief Buffington's desk awaiting his decision. The contest on some of the items is very keen, notably the item calling for 240 milling machines. A peculiar circumstance in connection with this item is that several of the bidders seem certain that they are in on the ground floor and the confidence of each is really remarkable.

The Westinghouse matter is still undecided, in fact some of the bids are not entirely prepared as yet.

The Automobile Company of America, whose plant is at Marion, N. J., are talking machine tools, but have not yet purchased. They are not looking for a large lot. Their present equipment, which was secured almost a year ago, includes many of the first rate tools.

It will be recalled that some time ago we noted the removal of the plant of the Storey Motor & Tool Company from Trenton to Harrison, N. J. The company have since been reorganized, and now operate under the style of the Storey General Electric Company. The new company are capitalized at \$3,500,000. I. E. Storey, the former proprietor of the Storey Motor & Tool Company, is president of the new company. The new plant at Harrison is being equipped with considerable new machinery.

A rumor has been floating about in the street for some time, which was to the effect that the W. & A. Fletcher Company of Hoboken, N. J., intend adding to their marine engine and boiler building plant. A fact which may be of significance in this connection is that the company have just purchased a large tract of land fronting on the Hudson River and adjoining their present plant.

The Vehicle Equipment Company, who are equipping a plant at Brooklyn, N. Y., for the purpose of building motors for trucks and automobiles, have been in the market during the last week purchasing machine tools. Their purchases amounted to about \$20,000 and were more in special lines. A good order for milling machines was given to the Brown & Sharpe Mfg. Company.

The Weston Electrical Instrument Company of Newark, N. J., who are equipping their new plant at Waverly, N. J., have placed an order with the Buffalo Forge Company of 39-41 Cortlandt street for the forge shop equipment, including several down draft forges. The new buildings at Waverly were erected some time ago, but the Weston works at Newark were so filled with orders that time could not be found for moving.

An order for the forges and similar blacksmith shop equipment to be installed in the new plant of the Union Steel Works, at Dunmore, Pa., has been awarded to the Buffalo Forge Company. The former concern are building extensive machine shops, and have recently given out a number of fine orders for machinery. The machines will be electrically driven, a large order for motors having been awarded to Sprague.

A new plant is to be built at Bath, Pa., by the Lawrenceville Cement Company, whose New York offices are located at 26 Cortlandt street. This company have been in the market for a large quantity of cement mill machinery during the last year and it is said that the Bath plant will necessitate further purchases of some magnitude.

Dooley & Smith of 95 Liberty street are purchasing large quantities of machinery for the Porto Rican market. The company have branches at San Juan and Ponce. Their purchases run in lines of machinery used in sugar, coffee and tobacco plantations. They have also exported a number of stone crushers and traction engines. They are buyers in the open market, not being tied up with any exclusive agencies.

H. E. Maxfield, sales agent for the Lawrence Machine Company of 39-41 Cortlandt street, has just secured an order for an electrically driven centrifugal pumping plant, to have a capacity of 5000 tons of water per hour. The plant is to be modern in every respect and the contract awarded to Mr. Maxfield calls for the entire equipment. The plant is to be installed in connection with the Kawasaki dry dock, at Kobe, Japan. The pumping outfit will consist of a 30-inch class A special Lawrence double centrifugal pump, direct connected to a motor of 275 horse-power. The General Electric Company will furnish the motor. The equipment will be the first of its kind ever installed in Japan for a similar purpose and the contract was taken in spite of very keen competition on the part of European manufacturers.

The Lawrence Company have also received a contract for the pumping machinery to be used at the new filtration plant, at Middletown, N. Y., and the pumping equipment to be installed on the steamship "Fidelity" of the United Charities Department, New York City. The former equipment will consist of a 12-inch class A centrifugal pump, direct connected to a 10 x 10 inch Lawrence vertical engine. It will have a capacity of 120,000 gallons per hour. The equipment for the steamship "Fidelity" was ordered by Charles Yates, Supervising Engineer.

Gould & Eberhardt of Newark, N. J., have just received an order for a very large automatic gear cutting machine from the International Steam Pump Company. The machine is to be installed in the company's Deane plant, at Holyoke, Mass.

The E. P. Allis Company, whose New York offices are now located at 95 Liberty street, received the contract for the engines and generators for the new plant of the Government Printing Office. There will be two

cross compound horizontal Corliss engines, direct connected to two 600-kw. Crocker & Wheeler generators.

Catalogues Wanted.—On the night of December 16, 1900, the offices and drafting rooms of the Department of Construction and Repair, Navy Yard, Norfolk, Va., were entirely destroyed by fire, together with their records, plans, correspondence, catalogues, price-lists, &c. Naval Constructor A. W. Stahl, U. S. N., head of that department, will be pleased to receive copies of catalogues and price-lists of tools, machinery, shipbuilding materials, and of other navy yard supplies, in order that the files and records of the Requisition Office of that department may be replenished.

Machinery Wanted.—A foreign correspondent desires to know the names and addresses of makers of horseshoe machinery and of makers of shovel machinery.

Who builds machinery for making skewers and tooth-picks?

Information Wanted.—Who produces hemp machinery?

A New Sheet Mill.—W. J. Stule, Canton, Ohio, formerly secretary of the Canton Roll & Machine Company, announces that he has purchased about 150 acres just west of the city limits. On this ground a company of Canton capitalists will erect a six-mill plant to cost approximately \$250,000, and will employ about 300 hands at the start. The main building will be a substantial steel structure, 300 x 130 feet, which, with the other smaller buildings, will be lighted and operated by electricity and equipped with electric cranes and modern machinery throughout. The contract for rolls and rolling mill machinery has been placed with the Canton Roll & Machine Company, and is to be completed about April 1.

A. Lescher & Sons Rope Company of St. Louis, Mo., will open an office and warehouse January 1 at 92 Centre street, New York City, where they will carry a full stock of wire rope. C. H. Tucker, secretary and treasurer, arranged for this last week when in New York. At the same time Mr. Tucker closed a contract for a Lescher Company's patent wire rope tramway, 19,000 feet long, to be shipped to South America.

The first shipment on a large contract for cables and equipment for a thoroughly modern electric lighting and power plant in the city of Mexico was made last week by the Standard Underground Cable Company of Pittsburgh, from their works at Perth Amboy, N. J. Both plants of the Standard Underground Cable Company, at Perth Amboy and Oakland, Cal., are running to full capacity. The company are filling several foreign contracts, among them one for the equipment of an electrical railroad at Seoul, the capital of Corea, and another for some Government work in Japan.

A Large Order for Blowing Engines.—We can state that the Carnegie Steel Company of Pittsburgh are in the market for ten blowing engines of enormous capacity. These are to be installed at the four Duquesne furnaces, which are to be completely remodeled and enlarged, and the present blowing engines taken out. It is only two or three years since these furnaces were built, and they have made wonderful records for production. The Carnegie Company have, however, decided to remodel and enlarge them, bringing their capacity up to 700 tons a day each or more.

The United States Aluminum & Metal Mfg. Company is the title of a new organization recently formed for the purpose of producing the Acme aluminum metal, brass and phosphor bronze castings, rubber roller brakes, &c., at 1623-1625 Blue Rock street and the C., H. & D. Railroad, Cincinnati, Ohio. The company are now busily engaged in completing their plant, a structure 75 x 125 feet, two stories, and expect to be in full operation by January.

The Philadelphia Machinery Market.

Office of *The Iron Age*, Forrest Building, {
PHILADELPHIA, PA., December 22, 1900. }

The closing month of the year has not produced any very startling features in the Philadelphia machinery market. It was generally expected that a slight falling off would take place in the last two weeks of the year and there has therefore been no disappointment. With many concerns this is a period of stock taking, closing of books, &c., and one in which the placing of orders is generally deferred until after the first of the year. The business of the month, however, has been satisfactory and some of the manufacturers booked large orders during the early part of the month. On the other hand, inquiries have been heavy in many lines and it is quite probable that a substantial volume of business will be placed before the new year is many days old.

There has, however, been one exception to this general rule. Business with the shipyards of this district has gone forward in leaps and bounds. Within the past two weeks contracts for over \$5,000,000 worth of new work have been taken by the Delaware River shipyards, and unless all signs fail a Government contract for several millions additional will be taken by the Wm. Cramp Ship & Engine Company before the close of the year.

The export demand continues to drag and in some lines has fallen off entirely. This condition, however, is not expected to continue; active business is looked for early in the new year, by which time it is expected that the policy for the year will have been formulated by foreign buyers.

The year, however, taken as a whole, has been universally satisfactory, nearly all the manufacturers having done a larger business than during the year previous. There have been dull periods in all lines, but then the busy periods have more than offset the former. Many concerns have had the busiest year they ever had and are carrying forward into next year a large amount of business.

The machine tool manufacturers are rounding out a very active year. Trade, both foreign and domestic, has been very heavy, and a large amount of money has been expended for renewal and new equipments of this class of machinery. The conditions at present are very good and the prospects of the new year bright. Some heavy inquiries are in the market and large orders will no doubt be placed early in the year.

The locomotive trade has also had an active year. The Baldwin Locomotive Works, who have spent a large amount of money in the improvement of their plant, have built during the year 306 more locomotives than during the previous year, and have exceeded their export shipments over last year by 25 locomotives, and this during a Presidential year, when railroads are inclined to withhold their orders for equipment.

The smaller engine and machine tool trade has had an excellent year, the general volume of business being in excess of that during 1899. The condition of this line of trade may be said to be very good, both present and prospective.

The general supply trade is of good tone, although some falling off is noted as usual at this season of the year, but will no doubt take a decided spurt after the holidays.

Prices in general are firm and stronger than last month.

The Hess Machine Company, manufacturers of file cutting machines, special tools, &c., have had a very prosperous year. Their heaviest trade has been in the export line, which has grown to extensive proportions and increased this year fully 50 per cent. over last year's trade. Home trade at this time is also very good and inquiries, both foreign and domestic, are holding up well. Among recent shipments abroad have been three file cutting machines for French territory, five for points in England, and regular shipments are being made to Germany. Among recent domestic orders are a number of machines for the Madden File Company, Middletown, N. Y., and for the American File & Tool Company, Elizabethport, N. J.

The Pennsylvania Machine Company report a good

volume of business for this month. Inquiries have been good on all lines and the outlook for next year's trade appears very favorable. Among recent shipments have been several engines for local delivery, one 8 x 10 inch and one 9 x 10 inch cylinder. One 260 horse-power engine was shipped to the Lehigh Valley cement district and local parties have taken a 75 horse-power Westinghouse engine. An improved self feeding gang ripping saw and all appliances was recently shipped to Williamsburg, Va., and delivery to local parties was made of a 6 x 4 x 6 inch duplex steam pump.

The Lodge & Shipley Machine Tool Company, Philadelphia branch, have had a satisfactory month and the volume of business for the year has been large. Inquiries are good and shipments of a number of lathes, planers and milling machines have been made. Trade in Reeves' variable speed pulleys holds up nicely and a favorable view is taken of the new year's business.

Trade with the Thomas H. Dallett Company for the past year has been quite satisfactory and compares favorably with that of the preceding year. Inquiries are good and business conditions appear to be favorable for next year. Their foreign trade has been good, but has been less active during the past two months. Shipments of drills and other tools have been made by them to nearby points; one of the large boiler shell drills was recently shipped to Richmond, Va., and several have been delivered to the local shipyards.

I. H. Johnson, Jr., and Co., report that their trade has been quite satisfactory, notwithstanding the inconvenience of building operations during the year. Inquiries have been of good volume and some large and satisfactory orders have been taken. A number of lathes are under construction, among which may be mentioned three 60-inch and two 66-inch swing and of long length, also some heavy lathes for forge shop work. Some smaller lathes have been shipped to the Pittsburgh district and a number of others are nearly ready for delivery.

The Philadelphia Roll & Machine Company report that business with them during the past year has been quite satisfactory. They have run their plant without interruption throughout the year and have at times been compelled to work overtime. Trade fell off during August and September, but since then has been of good volume. Conditions this year have been more satisfactory than last year, contracts have been placed with greater freedom and buyers are reported to be more reasonable in their demand for deliveries. The capacity of the Philadelphia Roll & Machine Company is about 1,000,000 pounds per month, and the average output will not fall far short of that amount. Among recent shipments may be noted a number of rolls for the Maryland Steel Company, Baltimore, Md., and for the Pennsylvania Steel Company, Steelton, Pa. Castings for 10-inch disappearing gun carriages were also shipped recently to the Midvale Steel Company, Nicetown, Philadelphia.

The physical test record on these castings was most uniform and showed a tensile strength of from 34,000 to 37,000 pounds to the square inch.

The Southwark Foundry & Machine Company have had a busy year, during which the shops have been continuously run on full time. Some falling off of trade was noted during the early months of the year, but increased business followed, so that the year on the whole compares favorably with the previous one. Shipments of heavy machinery, engines and large Weiss condensers have recently been made, and advanced orders are sufficient to carry them well into next year.

The Philadelphia Machine Tool Company have been actively employed during the past two months. Inquiries have been of good volume and some very satisfactory orders have been booked, among which is one for a large chain testing machine, 600,000 pounds capacity. This machine is the largest knife edge machine yet attempted for chain work. Several other orders for standard testing machines have been received, and orders have also recently been booked for a large multiple punch and a large special riveting machine.

The American Pulley Company, manufacturers of all wrought steel pulleys, report a very satisfactory condition of trade. Inquiries have been holding up well, al-

though dullness incidental to the closing of the year is now being felt. Notwithstanding the inconvenience of moving to their new plant and the delays incident thereto, the year's business has been very satisfactory, and orders now on hand will carry them well over into next year. Heavy shipments of pulleys are now being made, both to foreign and domestic points. The installation of machinery now under way will enable the American Pulley Company to double the output of their plant.

Geo. V. Cresson Company are running all departments on full time and continue doing heavy business on all lines manufactured by them. Inquiries hold up well and the condition of trade during the year can be said to be quite satisfactory, with favorable outlook for next year's trade. The improvements formerly mentioned have been completed and additional cupola and equipments for gear molding have been installed. Foreign trade has been good; recent shipment of crushing rolls to Japan and power transmission machinery to England and to Rotterdam have been made. The Franklin Air Compressor Company, Franklin, Pa.; Brighton Mills, Passaic, N. J., and the Darlington Cotton Mills in the South were also equipped with power transmission machinery. Orders are of good volume and there is considerable for next year on their books.

The Link-Belt Engineering Company have been busy continuously through the year. The volume of orders received compares very satisfactorily with those of last year. Inquiries are numerous and the condition of their general trade is good. Considerable business was done in Cuba during the past year and the outlook for increased business is favorable.

The Harrison Safety Boiler Works have had a large increase in trade during the past year. They have increased their facilities for turning out work by enlarging their foundry 40 x 60 feet. Their foreign trade has been good and shows a satisfactory increase. A recent shipment by this firm to Han Kow, China, may be noted, consisting of a complete power plant, boiler, condenser, purifier, feed pumps, &c. Orders on hand are of good volume, among which is one 600 horse-power heater for export to Glasgow, Scotland.

Pedrick & Ayer, manufacturers of air compressors, hoists, riveters, &c., continue very active in all branches of their trade. Inquiries keep up pretty fairly, although there has been some falling off in the foreign demand, which until recently has been exceptionally heavy with them. Local trade is, however, very active and this year's business is far ahead of that of last year. Among recent shipments may be mentioned a large open side planer for the Bethlehem Steel Company. This tool is 18 feet in length over all and has a working length of 12 feet and width of 42 inches. Shipments of a number of pneumatic compression riveters have also been made, several for Detroit, Mich., delivery and a number for the Toledo Bridge Company, Toledo, Ohio.

Continued activity is to be noted at the crane department of the Niles-Bement-Pond Company. Inquiries have been good and a number of satisfactory orders have recently been taken. The new power plant has been completed and is in operation, and the enlargement of the machine shops and the new erecting shop will be completed by January 1. New 15-ton cranes have been installed in each of these buildings. The railroad facilities of the plant have been largely augmented by sidings running through the bridge and erecting shops, and throughout the yards. All departments of the plant are busy and 50 different cranes are now in course of construction. Among recent orders may be noted five 10-ton cranes, 91-foot span, for the American Car & Foundry Company, at the Peninsula Works, Detroit, Mich., and one 10-ton, 48-foot span, crane for the Lynn, Mass., shops of the General Electric Company. Two 15-ton cranes have recently been shipped to the Algonia Iron Works, Sault Ste. Marie; two 30-ton cranes to the Pond Machine Tool Company, Plainfield, N. J.; one 30-ton, 68-foot span, crane for the Phoenix Iron Works, and one 15-ton, 50-foot span, to the Lehigh Foundry Company, Fullerton, Pa.

Alfred Box & Co., manufacturers of cranes, hoists, &c., report a very satisfactory year. Last year was good with them, but the trade this year is far ahead of the previous one. They have been running their plant to

its fullest capacity and have a large amount of work on hand at this time. Their heaviest line has been in cranes and these have been mostly of the larger sizes.

Dienelt & Eisenhardt have been continuously busy and have run their plant on full time throughout the year. Foreign trade on their line of printing machines for oil cloth and other fabrics still continues active. Business in hydraulic jacks and dead stroke hammers also remains firm, especially in the home market. Inquiries on all lines are good and the prospects for next year's trade considered favorable. A very satisfactory year has about been concluded and additions to their plant are under consideration.

The J. W. Paxson Company have had a prosperous year. Some falling off in trade has been noticeable during the past month, but inquiries are good and the prospects for next year's trade very favorable. Among recent shipments made was a complete sand blast plant and exhaust tumbling barrels for the Philadelphia Stove & Foundry Company, Philadelphia. Several cupolas have also recently been installed; one of 10 tons per hour capacity was lately delivered to the Tioga Foundry Company, Philadelphia, Pa.

The Energy Elevator Company have been extremely busy, a condition which has existed with them throughout the year. Inquiries have been good and a large number of orders have been booked. Elevators have been installed all over the United States, as well as Canada and Nova Scotia. Some recent shipments have been made to Halifax, N. S.; Fayetteville, Texas; New Castle, Wyo.; Winfried, Iowa; Fairmount, W. Va., and Portsmouth Va. Local trade is very extensive and numerous elevators have been recently installed.

The Baldwin Locomotive Works have passed through a very active year, during which they built some 1217 locomotives, of which 363 were for export trade. This is a remarkable showing compared with that of last year, when 901 locomotives were built and 338 exported. Inquiries during the past month have been good and a number of substantial orders have been booked. Foreign trade during the past two months has fallen off some, but an early recovery is probable. The Baldwin Locomotive Works enter the new year with favorable conditions, and have about the same amount of work to carry forward that they had at the beginning of the present year. Active progress is being made with the improvements under way and the new flange shop will shortly be under roof. Among recent shipments made were 20 locomotives on account of an order of 40 for the Pennsylvania Railroad. The last six engines for the "Big Four" are about ready for delivery, and they are also finishing the last of an order of 60 for the Union Pacific Railroad and of the 165 contracted for by the Baltimore & Ohio Railroad. Numerous shipments of engines for other railroads and private concerns have also been made.

Although not officially awarded contracts for new war ships by the Government, there seems to be little doubt but that the Wm. Cramp Ship & Engine Building Company will have the building of one of the 16,000-ton battle ships and two of the 15,000-ton cruisers for which bids were recently opened. The expected contracts mean three years' steady employment for the ship workers of the Kensington district. Should the contract be given the Cramps it will enable them to maintain their full force of 8000 men, with the work now in hand, for fully four years. In addition to the above there is still considerable business doing. It will take six months yet to finish the 12,500-ton Russian battle ship "Retzivan." The "Maine" is yet to be launched and the great 19,000-ton American liners "Kroonland" and "Zeeland" are about one-quarter completed, as are the two 4000-ton steamers for the Clyde Line. The 500-ton Ward Line steamers "Monterey" and "Esperanza" are about three-quarters done. During the present year the company finished the battle ship "Alabama," 11,500 tons; the Russian cruiser "Variag," 6500 tons; three 8000-ton steamers for the Oceanic Line, the "Sierra," "Sonoma" and "Ventura," and several for the Ward Line.

The Kensington Shipyard Company (Cramp's Dry Dock) have been quite busy; some extensive repair work to large vessels has been done, as well as some new

work. This plant was formerly the Chas. Hillmans Ship & Engine Building Company, and since purchased by the Kensington Shipyard Company has been extensively repaired. New city and river water connections have been made and extended throughout the yard. A power house has been built and two 300 horse-power Stirling boilers installed. New air compression and electric generating plants have also been installed. Extensive repairs have been made to the dry dock and both marine railways entirely rebuilt. The steamers "Montauk Point" and the "Euxinia" (Danish) have recently undergone extensive repairs to their hulls and forward parts. Among the new work being done is a new caisson, 106 feet long, under construction for the Boston Navy Yard dry dock.

The Diamond Drill & Machine Company, Birdsboro, Pa., continue busy in all departments. Inquiries are numerous and prospects exceedingly bright. The export and domestic trade in belt lacing machines has almost doubled during the year just past. Orders have recently been booked for a number of large gear wheels, fly wheels and other heavy castings, the largest gear wheel weighing about 50,000 pounds. They are also building a number of heavy ladle cars.

The Detrick & Harvey Machine Company, Baltimore, Md., have continued exceptionally busy throughout the year. On their line of open side planers they have for the past two years shipped on an average one a week. The foreign trade has been good and fully equal to that of last year. Inquiries are holding up well and a good share of business is being taken. They have in course of preparation a new catalogue descriptive of their bolt threading and screw cutting machinery, which will show some new designs and improvements in these lines of machines. Among recent shipments may be mentioned one largest size open side planer, 72 x 72 inches by 16 feet, for export to England. This machine has an aggregate weight of about 100,000 pounds. Several planers have been sold to the United States Government, one each having been delivered to the Mare Island, Puget Sound and Brooklyn navy yards, and one shipped to the Asiatic naval station at Manila, P. I.

The Washington Electric Company, Pittsburgh, Pa., have recently shipped one 24-foot open side planer and Remington & Sherman, Philadelphia, have been delivered one, which is the fifth planer which the Detrick & Harvey Company have delivered to this firm. Trade in horizontal drills, bolt threading and screw working machinery has also been very active, a large number having been shipped to different parts of the country.

The Cleveland Machinery Market.

Office of The Iron Age, The Cuyahoga, }
CLEVELAND, OHIO, December 24, 1900. }

The majority of local manufacturers of machine tools say that December has been a better month than either October or November, despite the fact that there has been an appreciable falling off during the past few days, caused by the interruptions of the holidays. From all indications January will be the banner month of the winter, as the majority of people state that their inquiries indicate that a large amount of business of all kinds will be closed up shortly after the first of the year. Since the election a number of concerns have decided to increase their facilities, and several contracts for additions have been closed up during the past two or three weeks, while others will be closed as soon as plans can be completed. The half million dollar fire which destroyed the plant of the Brown Hoisting Machinery Company will make an opening for a good contract, while several large office buildings which are contemplated give a promising outlook in this section for builders of structural material.

An immense quantity of machine tools found unavailable by the bicycle trust is to be unloaded by a Cleveland dealer, and the announcement has already created a flurry in the demand for small tools. Undoubtedly it will have a certain retarding effect upon the business of the manufacturers of these goods.

The molders' strike is still in effect in the local foundries and indications are that it will continue indefinitely;

ly; but machinery manufacturers are no longer having difficulty in securing prompt deliveries on castings. The National Foundrymen's Association continues in charge of the situation and Secretary Penton states that the bonus contracts have been renewed to March 1, and will be continued as long as there is difficulty in securing molders. The case of the employee of the American Shipbuilding Company who became intoxicated and then sued for his bonus, securing a judgment, has been appealed to a higher court and will be carried to the Supreme Court if necessary, the National Association being vitally interested in the outcome of the suit. Other suits of a similar nature which were threatened have failed to materialize.

Electric railway movements are engaging the attention of manufacturers of engines and electrical equipments and some large contracts are being closed up in this section.

There seems to be no limit to the demand for steel steamers for the Great Lakes trade, and despite the fact that their yards are full, the American Shipbuilding Company continue to take contracts for next season's delivery.

What is probably the largest stock of second-hand machinery ever turned into the market by one concern is being disposed of by George H. Bowler, the local second-hand dealer, for the American Bicycle Company. It includes the equipments of no less than a dozen bicycle plants in various portions of the country. Two weeks ago Mr. Bowler arranged to sell the equipments of several plants west of Buffalo, but within the past few days the Eastern plants have also been placed in his hands. The lists of seven Western factories show over 1200 machine tools and other factory equipment, not including thousands of small tools, dies, special bicycle machinery, besides office fixtures and furnishings. The valuation of the machine tool list mentioned amounts to over \$100,000, while the entire properties placed in his hands will amount to probably double that figure. Naturally, much of the machinery is of the smaller types of tools, but there is considerable heavy forging and stamping machinery. There is an enormous quantity of automatic screw machinery, and it is claimed that the list includes every size and make of screw machine placed on the market in the past ten years. Mr. Bowler will hold monthly sales in Cleveland and later sales at Buffalo, Syracuse, Elyria, Indianapolis and Toledo. At a sale held last week he disposed of over \$5000 worth of the stock. Naturally the sale created a decided sensation in this vicinity, and a number of prominent manufacturers took advantage of the opportunity to increase their equipments at bargain prices. Several local dealers are also buying some of the stock as a speculation. Another sale will be held about January 25.

Last week Mr. Bowler disposed of the plant of the O. P. Clay Stamping Company, which included 22 power presses for small work and 30 other pieces.

New Lake Steamships.

A new company, composed of capitalists interested in the shipment of grain from the Northwest to the seaboard and in elevators at Buffalo and Duluth, are being organized, according to Cleveland advices, to operate steamships on the great lakes. The leader in the enterprise, Frank H. Peavey of Minneapolis, Minn., has placed an order with the American Shipbuilding Company for four large steel steamships for the new company. The vessels will be 450 feet over all, 430 feet keel, 50 feet beam and 28½ feet molded depth. This will give each of them a carrying capacity of about 6000 or 7000 tons of iron ore or grain. They will be equipped with the latest machinery and will be samples of the finest boats on the chain of lakes. It is said that Mr. Peavey and the other capitalists behind the project will at once organize themselves into a company for the operation of the boats.

A Bucharest dispatch says that the Roumanian Government has broken off the negotiations with the Standard Oil Company for a lease of the oil fields of Roumania.

HARDWARE.

The Sale of Seasonable Goods.

At this season of the year there comes up the annually recurring problem of the question of how seasonable goods shall be sold so as to show some profit to makers and distributors.

The present condition is unhealthy and unsatisfactory enough, but no one has as yet suggested any remedy which meets all conditions. The root of the trouble lies in the fact that in order to provide the needed goods—such as Screens, Wire Cloth, Poultry Netting, Binder Twine, Woven Wire Fencing, and the like—it is necessary to manufacture them far in advance. Very few if any manufacturers have the warehouse space for storing the goods, besides the expense of so doing is too great to be considered, so the burden is shifted to the jobber, who in turn shifts it upon the retailer as the only practicable solution of the difficulty. In order to do this it is often necessary for the jobber to cut prices, as illustrated at the present time in the low figures at which Wire Cloth and Poultry Netting are offered by them to the retail trade—figures, indeed, so low as to leave a very narrow margin of profit.

With the present method there is the added certainty of the retailer having the goods when he needs them. As the retailer cannot sell the goods until the proper season for their use is at hand, he naturally does not care to pay for them, so his demand is upon the jobber for datings ahead and payments in the future, and as he cannot afford to run the risk of a declining market he likewise demands some guarantee as to prices up to date of shipment. In turn the jobber must get these concessions from the manufacturer, so there ensues a state of affairs of a sale that is not a sale, but is subject to revision at a later period, as to prices, and too frequently to cancellation—of many misunderstandings and of much opportunity for sharp practice, and of more or less demoralization.

It is a well established principle that few things are so destructive to good business methods as long terms of payment and guarantees of prices, especially as every such guarantee works only one way, and that in favor of the buyer, so it has come to pass that those articles which by reason of the uncertainty of their sale, and the limited season of their use, should be specially profitable to the jobber, are apt to be unprofitable and unsatisfactory to both manufacturer and jobber.

It is always easier to state a difficulty than to suggest a remedy, and until the manufacturers find it feasible to adopt some other method of marketing these goods it does not appear likely that there will be any improvement in present conditions.

The Holidays' Trade.

There is little reason to doubt that with the general prosperity prevailing holiday trade has been exceptionally large and satisfactory. Of this the Hardware trade have probably reaped this year a larger share than ever, as this season is recognized as one in which a considerable volume of business can be done and on a class of goods yielding very satisfactory margins of profit.

There is, however, a wide difference in the effect which the coming of the holidays has upon Hardware stores. With many there is little indication of the presence of

the holidays, as business runs along on substantially the same lines it has moved on during the year. With others there has been an earnest effort to secure a share of the business of holiday shoppers, and the stores have witnessed something of a transformation. The somewhat prosaic Hardware store is enlivened by the presence of goods which from their attractiveness and utility are supposed to be suitable for presents, and to make an appeal to the fancy and the purses of the public. In many cases the signs in the window, the advertisements in the newspapers, a touch of holly perhaps in the decorations, a brighter illumination in the evening and an air of increased bustle and activity have given the establishment a decided holiday appearance and atmosphere.

Hardware merchants who do not make the attempt to secure this class of trade must not be written down as necessarily lacking in enterprise. Some of them have in previous years endeavored to do a holiday business, but without success, and circumstances are such as to justify them in regarding this class of trade, in their case at least, as unpromising ground which it will not pay to cultivate.

Making, however, all allowance for such cases, it still remains true that those who take pains to secure their share of holiday purchasing give evidence of alertness and enterprise which promises well for the general success of their business. Making the endeavor to take advantage of the popular spirit at this season they will be likely to avail themselves of opportunities at other times and in other ways to increase their customers and extend their trade, and the spirit of enterprise that prompts holiday display and effort will be apt to characterize the direction of the business during the other months of the year.

The Trade Outlook.

The year closes with an exceptionally satisfactory and promising condition of things. Business during the last few months has been active and, as a rule, remunerative, manufacturers, jobbers and retailers sharing in the general well being. Even at this late day under the influences of the holiday season there continues to be a liberal movement of goods. The demand is not confined to small lots needed immediately, but something is doing in stock orders, which are coming in to the manufacturers from both wholesale and retail merchants. Traveling salesmen are naturally coming in, but those visiting the smaller trade especially find the results of their efforts such as to justify their continuing in the field as long as possible. The changes in price during the week have not been especially significant. The break in the price of Screws is the most important in the Hardware line, but this was owing to special circumstances, and is not to be regarded as indicating a weakness in the market at large. It is rather an illustration of what usually happens when high prices are maintained by artificial means. The general tone of the market is firm, and manufacturers are much less anxious than is usual to book orders in advance, and are anticipating a heavy demand for their goods on which they expect to realize fair prices. There is also a continued movement of Hardware abroad, and the indications point to a still larger growth of this business.

More manufacturers than ever are recognizing the foreign field as an exceedingly promising one, and are making their plans for cultivating it systematically and permanently. The favorable outlook for business both at home and abroad thus makes the situation at the end of 1900 exceptionally full of promise.

Special Reports.

Chicago.

The traditional quiet of the last half of December has not developed this year. The demand for Hardware keeps up surprisingly. Some of the local jobbing houses have been obliged to work their packing departments at night during the past week, which is probably unprecedented in their experience. The demand covers practically the full line of goods coming under the head of Hardware, and the great volume of business is not merely due to a large trade in holiday goods, although this has contributed its share. The retail merchants of Chicago have never in their history had such a heavy holiday trade. The great demand from the country at this time of the year shows how general is the prosperous condition of the people. Stocks are disposed of about as rapidly as they are replenished. Traveling salesmen have for some time been reporting at headquarters, but mail orders are coming in to an extent which almost makes up for their absence from their field of work. It is believed that a heavy trade is assured for at least the first six months of the next year. The business of the latter half will depend upon the crops.

St. Louis.

There is no mistaking the business being done over dealers' counters, if orders to jobbers may be taken as a reasonably safe index. Careful inquiry of jobbers as to whether the big business of this month is not largely for holiday goods brings out further unmistakable testimony that the bulk of trading is for staple, every day articles. Comparing dates, orders are numerically decidedly ahead of past seasons. Mail orders are exceedingly heavy. It is figured out that if the heavy percentage of salesmen now off the road were covering their territories the resultant business would go far toward making this December a notable one in the trade's history. There has really been no retail demand for winter and snow goods, the temperature throughout this territory having been against it. Movement of Skates and Sleds is not worth commenting on. The advance in Bolts has not appreciably affected the demand. Galvanized Iron is in free action. Wire products are in heavy sale, the spring business for Woven Wire Fencing coming forward now and promising steady growth. The Sisal Rope market is said to be weak, but scarcity in Cotton Rope helps to hold the latter firmer than would otherwise be the case. Binder Twine is being provided for against next season's wants. The Heavy Hardware trade report a very strong December business for Iron and Steel products.

Notes on Prices.

Wire Nails.—The demand for Wire Nails shows some falling off, though it keeps up well for the season. There is a feeling among some of the trade that an advance in price may be made to take effect about the first of the year. This surmise appears to be based mainly on the report that several large contracts for Nails have been recently placed. Others are buying simply to cover their early requirements, without apprehension of an early decline. Quotations are without change as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days:

To jobbers in carload lots.....	\$2.20
To jobbers in less than carload lots.....	2.25
To retailers in carload lots.....	2.30
To retailers in less than carload lots.....	2.40

New York.—Jobbers are doing only a moderate amount of business in Wire Nails, and expect that demand will be light until after the first of the year. Prices are as follows:

To retailers, carloads on dock.....	\$2.48
Small lots at store.....	2.55

For nearby delivery of small lots 5 cents per keg extra is charged.

Chicago.—Manufacturers are pleased at the continued stream of orders they are receiving for Wire Nails. Business continues as though it never would cease. Jobbers are steadily sending in orders for prompt shipment, showing that their stocks continually need replenishment. The local jobbers also report a surprisingly good trade. They have this week received carload orders from their customers, which is not only unusual at this season of the year, but surprising in view of the fact that prices are steady and no immediate advance is apprehended. Quotations are continued at \$2.35 for carload lots, with the usual advance in small lots.

St. Louis.—Car lot orders for Wire Nails, to jobbers, hold out to an extraordinary degree. Telegraphic orders are a feature and prompt deliveries are specified. Prices hold firm, and an occasional jobber is found who is of the opinion that an advance may not be far off. Price is \$2.40, base, in carloads to retailers \$2.45, base, for smaller lots.

Pittsburgh.—We continue to note an active demand for Wire Nails, which has shown very little falling off as yet, notwithstanding the lateness of the season. Demand continues largely for quick shipment, showing that stocks of Nails in jobbers' and retailers' hands are very low. All the Wire Nail mills are running to full capacity. We quote, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days:

To jobbers in carload lots.....	\$2.20
To jobbers in less than carload lots.....	2.25
To retailers in carload lots.....	2.30
To retailers in less than carload lots.....	2.40

Cut Nails.—The holiday quiet is felt in Cut Nails, resulting in a smaller demand. In reaffirming December prices for the month of January the manufacturers reserved the right, as is their custom, to advance or reduce prices without notice, except on orders already placed. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, 2 per cent. off in 10 days:

Carload lots.....	\$1.95
To jobbers in less than carload lots.....	2.00
To retailers in less than carload lots.....	2.10

New York.—Local requirements for Cut Nails have fallen off to a considerable extent. Prices remain unchanged as follows:

To jobbers in carload lots on dock.....	\$2.13
To jobbers in less than carload lots on dock.....	2.18
To retailers in less than carload lots on dock.....	2.31
Small lots from store.....	2.25

Chicago.—A moderately active trade is reported by jobbers in Cut Nails, but it is larger than expected at this season. Small lots from stock are quoted at \$2.25.

St. Louis.—No business out of the usual is being done in Cut Nails. Price remains at \$2.30 to \$2.40, base.

Pittsburgh.—The Cut Nail manufacturers have reaffirmed December prices for January delivery. We note a fair demand. We quote, f.o.b. Pittsburgh, terms 60 days, 2 per cent. off in ten days, as follows: Carload lots, \$1.95; jobbers, less than carload lots, \$2.

Barb Wire.—Reports from various points indicate that Barb Wire continues in fairly active demand. Quotations for domestic trade are as follows, f.o.b. Pittsburgh, net cash 60 days, or 2 per cent. discount for cash in 10 days:

To jobbers in carload lots, Painted.....	\$2.50
To jobbers in carload lots, Galvanized.....	2.80
To jobbers in less than carload lots, Painted.....	2.55
To jobbers in less than carload lots, Galvanized....	2.85
To retailers in carload lots, Painted.....	2.60
To retailers in carload lots, Galvanized.....	2.90
To retailers in less than carload lots, Painted.....	2.70
To retailers in less than carload lots, Galvanized....	3.00
Ellwood and Baker Wire is 5 cents and Washburn & Moen Glidden 10 cents per 100 higher than the foregoing prices.	

Chicago.—Although manufacturers fully expected the demand to diminish sharply at this time, it does not yet show any indication of decreasing. Continued sales are being made of large lots. Local jobbers are also having an exceedingly excellent demand from stock. Prices are

continued at \$2.70 for small lots of Painted and \$3 for Galvanized Barb Wire from stock, with the usual reduction on carload lots.

St. Louis.—The very large December business done in Wire products astonishes the trade. Prices so far show no change. Painted is \$2.70 in carloads to retailers; smaller quantities, \$2.75. Galvanized is 30 cents higher.

Pittsburgh.—There is a good demand for Barb Wire and the tone of the market is firm. Export trade also continues very heavy. For domestic trade we quote: Galvanized Barb Wire, \$2.80, in carload lots to jobbers, and Painted, \$2.50. Terms 60 days net, 2 per cent. discount for cash in 10 days, f.o.b. Pittsburgh.

Plain Wire.—The demand for Plain Wire continues good. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. off for cash in 10 days:

	Base sizes.	
	Plain.	Galv.
To jobbers in carload lots.....	\$2.15	\$2.55
To jobbers in less than carload lots.....	2.20	2.60
To retailers in carload lots.....	2.25	2.65
To retailers in less than carload lots.....	2.35	2.75

The above prices are for the base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the advances indicated in the following table:

Plain Fence Wire Advances (Catch Weights).				
Nos.				Galvanized.
6 to 9.....	Base.....			\$0.40 extra.
10.....	\$0.05 advance over base.....			.40 "
11.....	.10 " " " ".....			.40 "
12 and 12½.....	.15 " " " ".....			.40 "
13.....	.25 " " " ".....			.40 "
14.....	.35 " " " ".....			.40 "
15.....	.45 " " " ".....			.75 "
16.....	.55 " " " ".....			.75 "
17.....	.70 " " " ".....			1.00 "
18.....	.85 " " " ".....			1.00 "

For even weight bundles, 50 pounds or over, 5 cents per bundle advance on above.

Chicago.—The trade in Plain Wire keeps up very well, maintaining its proportion with Wire Nails and Barb Wire. Small lots, Chicago delivery, are selling at \$2.35, base.

Pittsburgh.—There is a good demand, the mills making heavy shipments right along. We quote:

	Plain.
To jobbers in carload lots.....	\$2.15
To jobbers in less than carload lots.....	2.20
To retailers in carload lots.....	2.25
To retailers in less than carload lots.....	2.35

Galvanized Wire up to No. 14 is 40 cents advance on Plain, Nos. 15 and 16, 75 cents advance, and Nos. 17 and 18, \$1 advance. Terms are 60 days net, with 2 per cent. discount allowed for cash if paid in 10 days from date of invoice.

Screws.—On the 20th inst. the series of conferences between the Screw manufacturers resulted in the decision to make a reduction of about 25 per cent. in the price of Flat Head Iron Screws, and a similar reduction in other kinds. The new discounts are as follows, beyond which an extra 10 per cent. is readily obtainable:

	Discount.
Flat Head Iron.....	.85 %
Round and Oval Head Iron.....	.80 %
Round and Oval Head Piano, Unpolished.....	.80 %
Fillister Head Iron.....	.80 %
Flat Head Brass.....	.82½ %
Round and Oval Head Brass.....	.77½ %
Flat Head Bronze Metal.....	.75 %
Round and Oval Head Bronze Metal.....	.72½ %
Flat Head Nickel Plated on Iron.....	.70 %
Round and Oval Head Nickel Plated on Iron.....	.70 %
Flat Head Nickel Plated on Brass.....	.70 %
Round and Oval Nickel Plated on Brass.....	.70 %
Flat Head Iron Screws, Blued and Black, 5 per cent. advance on net.	

At the same time the character of the organization by which the manufacturers are associated together was changed, the pool being dissolved and a less formal and rigid agreement put into effect. The principal reason for this reduction is to be found in the fact that outside

competition is making itself felt to some extent in the market, but while the manufacturers naturally look with disfavor upon the development of new competition, they did not all recognize the necessity of meeting it with so drastic measures. It is rather early as yet to judge of the course of the market and the extent to which extra discounts will be given. It is anticipated that there will be a large demand for Screws, as stocks throughout the country are generally light, and this with the increased cost of the goods, which is higher than it used to be, and with the agreements between the manufacturers, will tend, it is hoped, to keep prices from being forced down to an unreasonably low level.

Carriage Bolts, Machine Bolts, &c.—An advance of about 2½ per cent. was made last week in the prices of Carriage Bolts, Machine Bolts and related goods. The new discounts are as follows, an extra 10 per cent. being given to the large trade:

	Discount.
Common Carriage Bolts.....	.70 and 2½ %
Machine Bolts with H. P. or C. P. Plain Nuts,	
	70 and 10 and 2½ %
Bolt Ends with H. P. or C. P. Plain Nuts,	
	70 and 10 and 2½ %
Bolt Ends with C. & T. Nuts.....	.70 and 2½ %
G. P. Coach Screws.....	.75 and 15 %
Cone Point Lag Screws.....	.80 %
Skein Screws.....	.75 and 15 %
Forged Set Screws and Tap Bolts.....	.65 %
Plow Bolts and Guard Bolts.....	.60 and 10 %

Nuts.—Advances were also made last week in the prices of both Hot Pressed and Cold Punched Nuts. The regularly announced quotations are now as follows, with the usual extras to large buyers:

	Off list.
Hot Pressed Square, Blank or Tapped.....	.580c.
Hot Pressed Hexagon, Blank or Tapped.....	.650c.
Cold Punched Plain, Blank or Tapped Square Nuts.....	.540c.
Cold Punched Plain, Blank or Tapped Hexagon	
Nuts.....	.580c.
C. T. & R. Blank, Square or Tapped Nuts.....	.560c.
C. T. & R. Blank, Hexagon or Tapped Nuts.....	.540c.

Building and Tarred Papers.—The trade situation in Building and Tarred Papers is one of uncertainty, with a pronounced tendency toward lower prices, the market having been an open one for several months on account of the existence of new conditions. Prices have long been controlled by a masterful organization, whose supply of important raw materials was obtained at exceptionally low prices. Certain methods have drawn other powerful interests into the same field, which, unless some agreement is reached, will result in still further demoralization. At present the competition is fiercest in Tarred Papers, the one and two ply in extremely large lots having been offered by at least one manufacturer as low as 40 and 60 cents per roll, respectively, but the quality is said to be much lighter than standard. While the same conditions as yet do not exist in the other specialties of this character, such as Rosin Sized Sheathing and Deadening Felt, they are sympathetically affected and show some recession in price.

Glass.—It is reported that the persistent efforts on the part of some of the Glass manufacturers outside of the American Window Glass Company have resulted in an agreement to form an association. It is expected that eventually most of the independent and co-operative manufacturers will become members, or at least will work in harmony with the new company. While the details are not at hand, it is understood that the general plan of the American Glass Company will be followed, in which all Glass manufactured by the individual factories becomes the property of the company, by whom prices are established and the Glass marketed. Manufacturers of Glass have refused to make prices for contract orders, possibly because they hoped to come to an amicable understanding among themselves regarding prices. Large jobbers have therefore been unable to make purchases for spring business. Regular quotations are as follows: For carload lots jobbers quote manufacturers' prices, with 5 per cent. added. Discounts for small lots from the jobbers' list of September 1,

which are uniform over the entire country, are as follows:

All single strength.....85 and 25 %
All double strength.....85 and 25 and 5 %

Paints and Colors.—*Leads.*—Prices for White Lead in Oil continue without change. An ordinary holiday business in small lots represents the activity of the market. Quotations are as follows: In lots of 500 pounds and over 6½ cents per pound; in lots of less than 500 pounds 7 cents per pound.

Oils.—*Linseed Oil.*—Business for the week in Linseed Oil has been indifferent. The close of the year has had some effect upon buying, but the unsettled and uncertain condition of the market is the result of manipulation. State and Western Raw is held at 53 to 58 cents, according to quantity and manufacture. City Raw is still quoted at 60 cents for carload lots, but it is understood that this price is shaded. Small lots of City Raw are quoted at 62 cents per gallon.

Spirits Turpentine.—Buying in small lots at this point has resulted in a declining market during the week under review. Accumulation of stocks and light buying are reported from Savannah. New York quotations are as follows: Southern, 40 cents per gallon; machine made barrels, 40½ cents per gallon.

The Sportsman.

A FABLE OF THE HARDWARE TRADE.

The following fable, contributed by a gentleman thoroughly familiar with the Hardware market, is referred to by him as describing the present situation in a well known line of goods:

Once upon a time a very small boy with a very big gun and an exceedingly small game bag sallied forth into the forest in search of a wild animal, which had been described to him as excessively shy and timid, and was known to scientists by the name of "Loop Werces." Poor little chap! It seems that his father had neglected to tell him that this wild animal was in reality a venerable grizzly bear. So that little fellow went along, banging at everything in sight, until old grizzly, who was just then at the top of a very high bluff, cried out: "Wait a minute, little boy, and I'll come down." So the boy loaded his gun and waited. But when Mr. Bear landed, the boy fled, with bear a close second, and at last accounts they were still running.

January Work in the Hardware Store.

WE take especial pleasure in laying before our readers the following interesting and suggestive letter, which brings up a practical subject which deserves the attention of the trade. We extend a cordial invitation to our readers to reply to the inquiry of our correspondent with advices on these points:

1. *To what extent is it feasible to lay out work in advance as described in the letter?*

2. *What work belongs especially to January?*

Our correspondent's communication is as follows:

In running our store we find it very useful to make out in advance a list of things to be done each month. For example, those we have down to be done in January are the following:

- Finish up inventory.
- Collect overdue accounts.
- Find out economies to be effected in the business.
- Make clearing sale of unsalable goods.
- Strengthen lines which have not paid, or drop them.
- Cultivate trade by appeals to large consumers personally or by letter.
- Obtain quotations from manufacturers on Lawn Mowers, Ice Cream Freezers and Steel Goods.
- Resample Cutlery.
- Renew soiled or worn out price cards.

Order new letterheads.

Try A. B. J. and B. F. C. (two of our clerks) at preparing advertisements.

Put away holiday stock.

Display Refrigerators, Skates, &c.

Arrange new racks for Shovels, Spades, &c.

Advertise winter goods and household articles.

Place orders for spring goods.

All these things should be done in January, but if we do not succeed in doing them all we carry the memorandum over to February and they are thus kept in mind.

We should like to know whether other Hardware merchants have a similar plan, and think it would be interesting to the trade if they would tell us what work they have laid out for January. Please to lay the matter before your readers. Very likely some merchants do not lay out their work in advance, and if *The Iron Age* should take up the discussion of this subject it might stimulate them to turn over a new leaf. In our judgment it is a great help in keeping things up in good shape and preventing business from getting into a rut.

Trade Organizations.

New England Iron and Hardware Association.

The regular monthly meeting of the New England Iron and Hardware Association, which was held at Young's Hotel, Boston, Friday evening, December 21, was more largely attended and of more interest than usual owing to a debate on the Ship Subsidy bill now before Congress. The association was fortunate in securing the attendance of Hon. John F. Fitzgerald, Congressman from Boston, and a member of the committee which reported the bill in the House of Representatives. Mr. Fitzgerald represented the minority, and argued against the bill. Hon. William S. Green, member of Congress from the Thirteenth Massachusetts district, was to have been present to speak for the bill, but, owing to the death of a near relative, which occurred on the afternoon of the meeting, was unable to be present. Mr. Green, however, forwarded his manuscript, which was read by Clerk John T. Boyd. William H. Lincoln, president of the Boston Chamber of Commerce, who has been for more than 30 years closely identified with shipping as owner and agent, also spoke against the bill, and Osborne Howes, secretary of the Boston Fire Underwriters' Association, objected to the subsidy principle, and advocated as a substitute free ships. The closing speaker was William F. Humphrey, president of the Boston Tow Boat Company, who favored the bill.

About 100 members and guests attended the dinner, presided over by President William Chamberlain of Portland, Maine, and the occasion was of great interest, as the bill was intelligently discussed pro and con. Although no vote was taken, a majority of the speakers did not favor the bill in its present form, claiming that it would give an undue advantage to transatlantic lines already established and doing a profitable business. They were unanimously in favor of the rehabilitation of the American merchant marine, and believed this would soon be accomplished naturally by the decrease in the cost of American built ships and the new opportunities for profit in ocean freight carrying. Mr. Fitzgerald favored a bill which would subsidize new lines to other than transatlantic ports, but objected to adding to the already large and profitable business of the International Navigation Company, Atlantic Transport Line and similar established and paying enterprises.

It is interesting to note that all the speakers agreed that the decline in American shipping has been due to the change from wood to iron and steel in the materials from which vessels are built and in the change from sail to steam as motive power. So long as the wooden ships were in fashion American vessels were found in all parts of the world, and it was not infrequent that a ship would leave Boston and not return to that port for five years, in the meantime performing the work now done by so-called tramp steamers. One of the speakers referred to the fact

that the present bill provided no subsidy for American built and owned ships which did not make regular trips between the United States and foreign ports, thus shutting out from participation in subsidies vessels engaged in tramp traffic.

Wisconsin Retail Hardware Association.

The fifth annual meeting of the Wisconsin Retail Hardware Association will be held in Milwaukee on February 6 and 7. All the indications point to a very interesting and enthusiastic gathering. The secretary's report will show that during the year a net gain of some 20 members has been made. The official programme is now in the printer's hands, and will be mailed to the trade about January 10. Some proposed changes in the constitution will be discussed by the association, and also the matter of affiliation with district associations. We are advised that reduced railroad and hotel rates have been secured.

Southwestern Kansas and Oklahoma Implement and Hardware Dealers' Association.

At a meeting held in Wichita, Kan., on the 13th inst., the Southwestern Kansas and Oklahoma Implement and Hardware Dealers' Association was organized, comprising both wholesale and retail Hardware and Implement merchants in that territory. The following officers were elected: S. H. Myton, Winfield, Kan., president; J. A. Smith, Kingfisher, Okla. Ter., vice-president; directors for one year: William Ferguson, Blackwell, Okla. Ter.; F. M. Spangler, Mulhall, Okla. Ter.; F. Zutavern, Great Bend, Kan.; W. A. Johnson, Wichita, Kan.; for two years: D. W. Blaine, Pratt, Kan.; C. H. Smith, Wichita, Kan.; W. J. McLane, Medford, Okla. Ter.; A. Graff, Wellington, Kan. The directors subsequently selected J. P. Dillon of Wichita, Kan., secretary-treasurer.

Refrigerator Notes

The Illinois Refrigerator Company, Morrison, Ill., have just issued the ninth annual catalogue of their line of Automatic Refrigerators. They announce that they have increased their manufacturing facilities about 33 1-3 per cent., placing themselves in good condition to take care of their customers. The Automatic line has a number of special features, including the company's own system to secure positive air circulation, a water trap making a perfect seal, combined mineral wool, dead air space and charcoal paper to secure good insulation, and a porcelain lined cast iron water cooler which is deep and very narrow, thus taking up little space, and can be filled from the top without opening any of the chambers. The illustrations of Refrigerators comprise 40 varieties and styles.

The Ranney Refrigerator Company, Greenville, Mich., and 103 Lake street, Chicago, have just issued a handsome 44-page catalogue of their Lapland, Monitor and Mascot lines of Refrigerators which has some features of special merit. It shows illustrations of the styles of trimmings used for the different Refrigerators, their interior and exterior construction, the circulation of the air and the manipulation of the removable parts of the Refrigerators. The catalogue contains 18 engravings of their line of Laplands, which are of oak; 20 of their line of Monitors, of ash, and 14 of their line of Mascot hard wood Refrigerators.

Baldwin Refrigerator Company, Burlington, Vt., issue an 84-page catalogue, showing their line of family Refrigerators, Grocers' Refrigerators, &c., for 1901. The company state that they manufacture about 135 styles and sizes in hard wood and soft wood, metal, porcelain and spruce lined Refrigerators. They also refer to the quality and design of their product as having been materially improved, while their factory capacity has been considerably enlarged and new and improved machinery added.

A new illustrated catalogue and price-list of the Monarch Cleanable Dry Air Refrigerators has just been issued for the season of 1901 by the Monarch Refrigerator

Works, Burlington, Vt., of which Greene & Smith are the proprietors. All of the company's goods have the latest all metal patented cleanable fixtures, including ice chamber, waste pan with cold ducts at the rear, waste pipe and ice rack. Among the special features are a movable front base, or flap, hiding the waste pan; floor of the provision room flush and easy to clean; corrugated galvanized iron provision shelves and ice racks; solid brass or bronze lever locks, butts and cup stands; patent ball bearing grip casters; porcelain lined iron cooler tanks; nickel plated faucets, and air tight air traps.

Requests for Catalogues, &c.

THE retail Hardware business of W. M. Parker, Reidsville, N. C., has been sold to P. H. Neal, who will enlarge it and conduct it under the style of the Neal Hardware Company. Mr. Neal was for some time connected with the Piedmont Hardware Company, Danville, Va. The new firm request catalogues, price-lists, &c., from manufacturers of General Hardware, Stoves, Harness, Buggies and other kindred lines.

J. C. Bidwell & Co., Hartford, Conn., who are wholesale and retail dealers in Rubber Goods, are making arrangements to enlarge the scope of their business, so as to include Hardware and such general supplies as are used by builders, contractors and manufacturers. The firm will accordingly be pleased to receive catalogues and price-lists pertaining to these lines.

Union Hardware & Electric Supply Company, 148 and 150 Weybosset street, Providence, R. I., who have recently embarked in business, are desirous of receiving catalogues and other printed matter pertaining to their line.

E. E. Schoening & Bro., dealers in Hardware and Cutlery, 305 North Twelfth street, St. Louis, Mo., request catalogues and quotations on Tinware and Enameled Ware, a line which they are intending to add to their present stock.

A Modern Chain Plant.

FOR several years past the firm of James McKay & Co., Chain manufacturers, whose works are located at Twenty-ninth street and Liberty avenue, Pittsburgh, have been badly cramped for room, and have had under consideration for a long time the matter of securing a new site and erecting a larger works to meet the growing demand for their product. For one cause or another definite selection of a site has not been made until recently, but we can now state that this firm have secured a site of land at McKee's Rocks, Pittsburgh, which measures 480 x 800 feet, containing nearly 9 acres. The ground is located on the line of the Pittsburgh, Chartiers & Youghiogheny Railroad, which is jointly controlled by the Pennsylvania Company and Pittsburgh & Lake Erie Railroad. There is also a working agreement with the Baltimore & Ohio Railroad by which their cars can be switched onto Pittsburgh, Chartiers & Youghiogheny Railway tracks without extra charge. The site, therefore, is practically located on three trunk lines, which will afford excellent facilities for receiving and shipping material.

On this site James McKay & Co. propose to erect a Chain works containing 60 fires for manufacturing Chain of sizes from 1/2 to 3-16 inches in diameter. Also 20 fires for making Machine Welded Chain 9-16 to 1 1/4 inches, and 20 fires for making Hand Welded Chain, making a total of 100 fires and giving employment to about 250 hands. The main building will be so arranged that by lengthening it 250 fires can be added.

It is the intention of the firm at the first to make only Chain, but when the Chain works are completed and in good running order a forge department is to be added for the manufacture of forgings needed for their own use, and possibly the firm may make forgings for the open market. All Chain made, even from the smallest size, will be made by power hammers. It is the intention of

the firm to locate their power plant away from the main buildings, and to operate the testing machines and other machinery and hammers entirely by electricity, putting the one large generator in the main power plant and distributing the power as it may be needed to the different parts of the works by several dynamos. This is referred to as an entirely new departure in the method of distributing power, but it is claimed a material saving will be reached, the horse-power of engines required being considerably less and the diameters of the lines of shafting will also be smaller.

James McKay & Co. will install in the new works what is said to be the largest testing machine that has ever been built for testing Chain. It will have a capacity of about 400 gross tons. The firm intend to make Cable for the largest ships. Some of it will be made from Iron not less than $3\frac{1}{2}$ inches in diameter, so that a testing machine of the above size will be required. This large testing machine, with the machine now in use in their present shops, will give the concern two testing machines in continuous operation, enabling them to proof test every foot of Chain before it is shipped. This has always been a practice with this firm.

The buildings to be erected will consist of a main building, facing the railroad, 175 feet long, two stories high and of brick and steel, with two wings. One wing will be 65 feet wide by 250 feet long, the other 40 feet wide by 275 feet long. These wings will also be built of steel and brick, but will only be one story high. It is also the intention of James McKay & Co. to erect 20 to 30 dwelling houses to be occupied as homes by their workmen.

When completed this firm will have what will probably be the most modern, as well as the largest, individual Chain factory in the country. Plans are being prepared for the new buildings and for the equipment and the work of erection will be pushed as fast as possible. The firm hope to occupy their new works about August of next year. They have been at their present location for about 20 years, but have been very much cramped for room for a long time, making the securing of new and larger works an absolute necessity.

Hubbard & Co.

HUBBARD & CO., who have heretofore maintained offices only at their works on Butler street, have decided to open down town offices in Rooms 701-702 Hamilton Building, Pittsburgh. The firm have felt the necessity of down town offices for some time on account of their growing trade, and also for the convenience afforded. They are manufacturers of Shovels, Spades, Scoops, Standard Railroad Track Tools, Coal Miners' Tools, Wrought Washers, Crowbars, Barn Door Handles, &c. The officers of the concern are C. W. Hubbard, president; J. W. Hubbard, general manager; S. A. Rankin, secretary and treasurer, and E. W. Zinsmaster, general sales agent.

Lang Cutlery Works.

THE LANG CUTLERY WORKS, Cedar Rapids, Iowa, manufacturers of Thread, Bolt and Tension Spring Shears, have just moved into their new factory. It is a two-story brick building, 60 x 120 feet, and is located on Third street, between Seventh and Eighth avenues. This building is of substantial construction. It has cement floors in the grinding and drilling departments, is lighted by electricity and is thoroughly equipped with new and improved machinery. The property adjoins the tracks of the Chicago & Northwestern and the Burlington, Cedar Rapids & Northwestern railroads, thus giving excellent shipping facilities. The officers of the company are B. B. Lang, president; H. M. Hunter, vice-president, and Z. L. Brewer, secretary and treasurer. They have recently opened a branch office at 102 Chambers street, New York City, in charge of W. J. Gluckert & Co.

McConnell Hardware Company, Brookston, Ind., have recently been incorporated with a capital stock of \$2000.

Trade Items.

TAPLIN MFG. COMPANY have removed their business from Forestville to New Britain, Conn. The company are manufacturers of Bathroom and Toilet Specialties, Window Stop Adjusters, Egg Beaters, hotel and club goods in bronze and nickel, &c.

FRANK F. WESTON, well known to the Hardware trade through his recent connection with the Eclipse Bicycle Company, Elmira, N. Y., and previously with prominent jobbing houses of New York City, has opened an office at 99 Chambers street, New York, and will establish himself as a manufacturers' agent. Mr. Weston's large acquaintance with the trade throughout New England and the Middle States affords him facilities for giving manufacturers excellent representation.

HULL BROTHERS COMPANY, Danbury, Conn., have purchased all the assets of the Hull & Hoyt Company and continue business at the old stand. The capital of the new company is \$60,000, and the officers are F. A. Hull, president and treasurer, and Thos. A. Hull, secretary. The company are manufacturers of the Kopf Double Generator Acetylene Gas Machine and the H. & H. Leather Aprons for blacksmiths, mechanics, &c.

The works of Edward S. Hotchkiss, Bridgeport, Conn., manufacturer of Horse and Barbers' Clippers, Curry Combs, Traps, Wrenches, &c., were totally destroyed by fire Saturday, December 22, the loss being estimated at about \$80,000. On this account it has been necessary to cancel orders in hand, as it will be a matter of some months before new buildings can be erected.

H. S. WOOLLEY, the representative in London of John H. Graham & Co., New York, returned to this country to spend the Christmas holidays on the "St. Louis" December 22. Mr. Woolley has been in the habit of making trips to Great Britain in this firm's interest for some time, but the last trip was the longest, he having been abroad since early in June. John H. Graham & Co., at their London office, 10 Duke street, carry a full line of American Hardware suitable for export.

Calendars, &c.

F. E. MYERS & BROS., Ashland, Ohio: The Myers Pumps and Hay Tools.

PEIRSON HARDWARE COMPANY, Pittsfield, Mass., retailers of Hardware, &c.

JOHN M. SMITH & SONS, Newport, Pa., wholesale and retail dealers in Hardware, Plows, &c.

WINCHESTER REPEATING ARMS COMPANY, New Haven, Conn.: Repeating Rifles and Shot Guns.

BURDITT & WILLIAMS, Boston, Mass.: Leather covered calendar memorandum book.

H. G. CORMICK, Centralia, Ill., dealer in Hardware.

ALMON H. FOGG & Co., Houlton, Maine, jobbers and retailers of Hardware, &c.

KIRSCHER & SON, Belleville, Ill., Hardware merchants.

Simmons Hardware Company's Artistic Catalogue.

SIMMONS HARDWARE COMPANY, St. Louis, Mo., have just issued a beautifully printed catalogue of 64 pages, each $7\frac{1}{4}$ x $4\frac{1}{4}$ inches, entitled "Best Tools Made." The catalogue is bound in dark red leather, the pages having gilt edges. Within are illustrated and described picked lines of Edge and other Hand Tools, which are referred to as the best of their kind. The paper, engravings and letterpress are in keeping with the goods they describe, making a publication especially handsome and unique. The pamphlet is published in English, German, French and Spanish, and is intended for distribution to the retail Hardware trade.

Bachelor & Co., Angola, Ind., have been succeeded by Snyder & Co., who have added to their line of Carriages and have a fine double store, with the latest improvements in shelving and fixtures.

Trade Winning Methods.

ADVERTISING METHODS OF A PHILADELPHIA HOUSE.

Kinkarter & Sheppard, Frankford, Pa., are using small Hardware cuts with good effect on envelopes, as shown in Figs. 1 and 2. The idea, though somewhat un-



Fig. 1.—Face of Envelope.

usual, is receiving favorable comment from their customers as an effective method of advertising.

Newspaper Advertising.

The firm are continuous advertisers in newspapers, making use of cuts, as shown in Figs. 3 and 4. The artistic monogram and circle shown on the flap of the envelope in Fig. 2 is frequently used also in their ad-



Fig. 2.—Back of Envelope.

vertisements. The advertisements are changed often, the firm considering this important.

WRITING AND PRINTING.—When preparing advertise-



Fig. 3.—Newspaper Advertisement.

ments the firm arrange them exactly as they want them to appear in print.

INCHES AND BRAINS.—They consider that the price paid for newspaper advertising should not only include

so many square inches of space and a certain amount of printers' ink, but that the printer should also use skill and taste in setting up the ad.

PRINTERS' STYLE.—The firm have tried the experiment of giving the papers the names of articles they wish advertised, together with some electrotypes, allowing the printers to arrange the matter, but in almost every case the results have been unsatisfactory. Some-



Fig. 4.—Newspaper Advertisement.

times it has been found that when exact copies of advertisements are sent to the papers, the printer will put electrotypes in different places from those indicated, to suit his convenience. The firm are curious to know whether other dealers have trouble along this line.

BULLETINS.

In addition to using regular advertising space in the leading local paper, C. M. Doxsee of Algona, Iowa, issues "quarterly bulletins" as a supplement to the paper. The bulletin covers one page of the paper, and extra copies are printed for distribution from the store. It has proved a profitable method of advertising.

CUTS AND PRICES.—Illustrations of the articles are always used where it is possible. Prices are added where practicable, as it is Mr. Doxsee's experience that the price is always interesting.

A STOVE CATALOGUE.

Geo. E. Speck & Son of Morristown, Tenn., retail Hardware and Stove merchants, issued for the fall trade a 12-page catalogue illustrating, with prices, a portion of the line of Cook and Heating Stoves carried in stock. The cost was about \$23 for 500 of the catalogues, including postage for mailing. This was their first attempt in this line. The results have been very encouraging, as hardly a day passed without some one coming into their store with one of the catalogues in hand, either to examine or purchase a Stove.

A CUTLERY DISPLAY.

It is the practice of the G. B. Churchill Company, Galesburg, Ill., to make window displays of one line of goods at a time. Following this method, the company recently devoted one of their show windows to a line of Cutlery of which they handle large quantities. At the back of the window were three wooden arched doorways, united by lattice work, painted white, forming a background. The top of one doorway was lettered "Razors," the next "Knives" and the third "Shears." Around the doorways goods corresponding to the lettering were secured. On the floor of the window more of these goods were displayed, circular price cards standing among them. Above the background and around the sides of the window was lettering calling attention to the brand and quality of the goods displayed.

the firm to locate their power plant away from the main buildings, and to operate the testing machines and other machinery and hammers entirely by electricity, putting the one large generator in the main power plant and distributing the power as it may be needed to the different parts of the works by several dynamos. This is referred to as an entirely new departure in the method of distributing power, but it is claimed a material saving will be reached, the horse-power of engines required being considerably less and the diameters of the lines of shafting will also be smaller.

James McKay & Co. will install in the new works what is said to be the largest testing machine that has ever been built for testing Chain. It will have a capacity of about 400 gross tons. The firm intend to make Cable for the largest ships. Some of it will be made from Iron not less than $3\frac{1}{2}$ inches in diameter, so that a testing machine of the above size will be required. This large testing machine, with the machine now in use in their present shops, will give the concern two testing machines in continuous operation, enabling them to proof test every foot of Chain before it is shipped. This has always been a practice with this firm.

The buildings to be erected will consist of a main building, facing the railroad, 175 feet long, two stories high and of brick and steel, with two wings. One wing will be 65 feet wide by 250 feet long, the other 40 feet wide by 275 feet long. These wings will also be built of steel and brick, but will only be one story high. It is also the intention of James McKay & Co. to erect 20 to 30 dwelling houses to be occupied as homes by their workmen.

When completed this firm will have what will probably be the most modern, as well as the largest, individual Chain factory in the country. Plans are being prepared for the new buildings and for the equipment and the work of erection will be pushed as fast as possible. The firm hope to occupy their new works about August of next year. They have been at their present location for about 20 years, but have been very much cramped for room for a long time, making the securing of new and larger works an absolute necessity.

Hubbard & Co.

HUBBARD & CO., who have heretofore maintained offices only at their works on Butler street, have decided to open down town offices in Rooms 701-702 Hamilton Building, Pittsburgh. The firm have felt the necessity of down town offices for some time on account of their growing trade, and also for the convenience afforded. They are manufacturers of Shovels, Spades, Scoops, Standard Railroad Track Tools, Coal Miners' Tools, Wrought Washers, Crowbars, Barn Door Handles, &c. The officers of the concern are C. W. Hubbard, president; J. W. Hubbard, general manager; S. A. Rankin, secretary and treasurer, and E. W. Zinsmaster, general sales agent.

Lang Cutlery Works.

THE LANG CUTLERY WORKS, Cedar Rapids, Iowa, manufacturers of Thread, Bolt and Tension Spring Shears, have just moved into their new factory. It is a two-story brick building, 60 x 120 feet, and is located on Third street, between Seventh and Eighth avenues. This building is of substantial construction. It has cement floors in the grinding and drilling departments, is lighted by electricity and is thoroughly equipped with new and improved machinery. The property adjoins the tracks of the Chicago & Northwestern and the Burlington, Cedar Rapids & Northwestern railroads, thus giving excellent shipping facilities. The officers of the company are B. B. Lang, president; H. M. Hunter, vice-president, and Z. L. Brewer, secretary and treasurer. They have recently opened a branch office at 102 Chambers street, New York City, in charge of W. J. Gluckert & Co.

McConnell Hardware Company, Brookston, Ind., have recently been incorporated with a capital stock of \$2000.

Trade Items.

TAPLIN MFG. COMPANY have removed their business from Forestville to New Britain, Conn. The company are manufacturers of Bathroom and Toilet Specialties, Window Stop Adjusters, Egg Beaters, hotel and club goods in bronze and nickel, &c.

FRANK F. WESTON, well known to the Hardware trade through his recent connection with the Eclipse Bicycle Company, Elmira, N. Y., and previously with prominent jobbing houses of New York City, has opened an office at 99 Chambers street, New York, and will establish himself as a manufacturers' agent. Mr. Weston's large acquaintance with the trade throughout New England and the Middle States affords him facilities for giving manufacturers excellent representation.

HULL BROTHERS COMPANY, Danbury, Conn., have purchased all the assets of the Hull & Hoyt Company and continue business at the old stand. The capital of the new company is \$60,000, and the officers are F. A. Hull, president and treasurer, and Thos. A. Hull, secretary. The company are manufacturers of the Kopf Double Generator Acetylene Gas Machine and the H. & H. Leather Aprons for blacksmiths, mechanics, &c.

The works of **Edward S. Hotchkiss**, Bridgeport, Conn., manufacturer of Horse and Barbers' Clippers, Curry Combs, Traps, Wrenches, &c., were totally destroyed by fire Saturday, December 22, the loss being estimated at about \$80,000. On this account it has been necessary to cancel orders in hand, as it will be a matter of some months before new buildings can be erected.

H. S. WOOLLEY, the representative in London of John H. Graham & Co., New York, returned to this country to spend the Christmas holidays on the "St. Louis" December 22. Mr. Woolley has been in the habit of making trips to Great Britain in this firm's interest for some time, but the last trip was the longest, he having been abroad since early in June. John H. Graham & Co., at their London office, 10 Duke street, carry a full line of American Hardware suitable for export.

Calendars, &c.

F. E. MYERS & BROS., Ashland, Ohio: The Myers Pumps and Hay Tools.

PEIRSON HARDWARE COMPANY, Pittsfield, Mass., retailors of Hardware, &c.

JOHN M. SMITH & SONS, Newport, Pa., wholesale and retail dealers in Hardware, Plows, &c.

WINCHESTER REPEATING ARMS COMPANY, New Haven, Conn.: Repeating Rifles and Shot Guns.

BURDITT & WILLIAMS, Boston, Mass.: Leather covered calendar memorandum book.

H. G. CORMICK, Centralia, Ill., dealer in Hardware.

ALMON H. FOGG & Co., Houlton, Maine, jobbers and retailors of Hardware, &c.

KIRSCHER & SON, Belleville, Ill., Hardware merchants.

Simmons Hardware Company's Artistic Catalogue.

SIMMONS HARDWARE COMPANY, St. Louis, Mo., have just issued a beautifully printed catalogue of 64 pages, each $7\frac{1}{4}$ x $4\frac{1}{4}$ inches, entitled "Best Tools Made." The catalogue is bound in dark red leather, the pages having gilt edges. Within are illustrated and described picked lines of Edge and other Hand Tools, which are referred to as the best of their kind. The paper, engravings and letterpress are in keeping with the goods they describe, making a publication especially handsome and unique. The pamphlet is published in English, German, French and Spanish, and is intended for distribution to the retail Hardware trade.

Bachelor & Co., Angola, Ind., have been succeeded by **Snyder & Co.**, who have added to their line of Carriages and have a fine double store, with the latest improvements in shelving and fixtures.

Trade Winning Methods.

ADVERTISING METHODS OF A PHILADELPHIA HOUSE.

Kinkert & Sheppard, Frankford, Pa., are using small Hardware cuts with good effect on envelopes, as shown in Figs. 1 and 2. The idea, though somewhat un-



Fig. 1.—Face of Envelope.

usual, is receiving favorable comment from their customers as an effective method of advertising.

Newspaper Advertising.

The firm are continuous advertisers in newspapers, making use of cuts, as shown in Figs. 3 and 4. The artistic monogram and circle shown on the flap of the envelope in Fig. 2 is frequently used also in their ad-

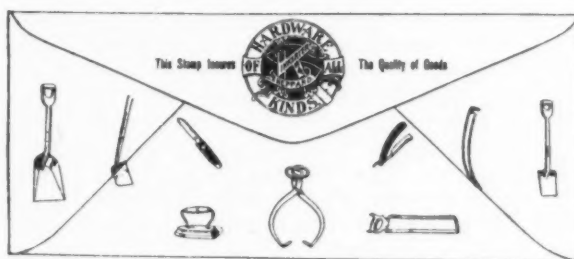


Fig. 2.—Back of Envelope.

vertisements. The advertisements are changed often, the firm considering this important.

WRITING AND PRINTING.—When preparing advertise-



Fig. 3.—Newspaper Advertisement.

ments the firm arrange them exactly as they want them to appear in print.

INCHES AND BRAINS.—They consider that the price paid for newspaper advertising should not only include

so many square inches of space and a certain amount of printers' ink, but that the printer should also use skill and taste in setting up the ad.

PRINTERS' STYLE.—The firm have tried the experiment of giving the papers the names of articles they wish advertised, together with some electrotypes, allowing the printers to arrange the matter, but in almost every case the results have been unsatisfactory. Some-



Fig. 4.—Newspaper Advertisement.

times it has been found that when exact copies of advertisements are sent to the papers, the printer will put electrotypes in different places from those indicated, to suit his convenience. The firm are curious to know whether other dealers have trouble along this line.

BULLETINS.

In addition to using regular advertising space in the leading local paper, C. M. Doxsee of Algona, Iowa, issues "quarterly bulletins" as a supplement to the paper. The bulletin covers one page of the paper, and extra copies are printed for distribution from the store. It has proved a profitable method of advertising.

CUTS AND PRICES.—Illustrations of the articles are always used where it is possible. Prices are added where practicable, as it is Mr. Doxsee's experience that the price is always interesting.

A STOVE CATALOGUE.

Geo. E. Speck & Son of Morristown, Tenn., retail Hardware and Stove merchants, issued for the fall trade a 12-page catalogue illustrating, with prices, a portion of the line of Cook and Heating Stoves carried in stock. The cost was about \$23 for 500 of the catalogues, including postage for mailing. This was their first attempt in this line. The results have been very encouraging, as hardly a day passed without some one coming into their store with one of the catalogues in hand, either to examine or purchase a Stove.

A CUTLERY DISPLAY.

It is the practice of the G. B. Churchill Company, Galesburg, Ill., to make window displays of one line of goods at a time. Following this method, the company recently devoted one of their show windows to a line of Cutlery of which they handle large quantities. At the back of the window were three wooden arched doorways, united by lattice work, painted white, forming a background. The top of one doorway was lettered "Razors," the next "Knives" and the third "Shears." Around the doorways goods corresponding to the lettering were secured. On the floor of the window more of these goods were displayed, circular price cards standing among them. Above the background and around the sides of the window was lettering calling attention to the brand and quality of the goods displayed.

New York's Cycle Show.

THE sixth annual exhibition of the National Cycle Exhibition Company will be opened in Madison Square Garden, New York City, on January 12. This year the Automobile and Motor Cycle will be shown in connection with the Bicycle. The exhibition will last for a week, and promises to be a most interesting and instructive one in the line covered by it.

Price-Lists, Catalogues, &c.

CONTINENTAL TOOL COMPANY, Frankfort, N. Y.: Catalogue of Farming Tools, showing their line of Forks, Hoes, Rakes, Hooks, &c. The later pages of the catalogue are devoted to heavy steel goods, comprising Coke, Coal, Beet, Stone and Tanners' Forks of extra strength and solidity.

E. C. ATKINS & Co., Indianapolis, Ind.: Attractively printed catalogue and price-list devoted to the Atkins Silver Steel Cross Cut Saws and Atkins Saw Handles.

MATTHEWS & WILLARD MFG. COMPANY, Waterbury, Conn.: Circulars relating to Lamps for Bicycles, Automobiles and other Vehicles, and also the Duplex Carbide Lamps for stores, the home, &c.

ALDER & BOYD, manufacturers' export representatives, 37 Warren street, New York: New edition of their illustrated descriptive catalogue, showing articles suitable for export trade, the net discounts in every instance being printed in connection with the particular item to which they apply. This catalogue includes the goods of 15 well-known manufacturers, and is intended for distribution through the medium of export houses.

NON-CORROSIVE METAL COMPANY, 37 and 39 Pitts street, Boston, Mass.: Circulars devoted to Cold Rolled Nickel Steel Bits, Tug Stops and N. C. Shaft Tips.

Among the Hardware Trade.

Bennett & Co. have removed their Hardware stock from Galena to Pittsburg, Kan.

Price & Spry, Hardware, Stove, Farm Implement and Buggy dealers, Mt. Pleasant, Iowa, are erecting a new building, 58 x 150 feet, two stories high. They expect to add a line of Furniture when the building is completed.

Cadby & Bartness, Hardware, Stove and Farm Implement merchants, Council, Idaho, have dissolved partnership, Mr. Cadby withdrawing. J. R. Bartness will continue the business under his own name.

W. Homer Green has purchased the Hardware, Stove, Farm Implement and Sporting Goods business of W. T. Greer & Son, Cairo, W. Va., and will continue at the old stand, in which a number of improvements have been made.

Jasper Waggoner has sold out his Hardware and Stove business in Mullin, Texas, to Senney & Son.

M. C. Malmgren has succeeded Malmgren & Fahnestock, Glasford, Ill., dealers in Shelf and Heavy Hardware, Stoves and Farming Implements.

L. W. Bradstreet has lately opened up in business in Portland, Maine, with a stock comprising Builders' Hardware, Cutlery, Tinware, Glass, Paints, &c.

Storck, Hopkins & Co. have succeeded Storck & Hopkins in the wholesale and retail Hardware, Stove and House Furnishing Goods business.

H. W. Fuos, formerly in business at Castroville, Texas, will open up in San Antonio, Texas, on January 1, with a stock comprising Shelf and Heavy Hardware, Stoves and Tinware, Farming Implements, Sporting Goods, &c., in which a wholesale and retail trade will be conducted.

Jos. B. Hutchins has succeeded Wm. Hutchins & Son, Hardware and Stove merchants, New Haven, Ky.

A. E. Small & Co. of Fairmont, Neb., have purchased the Hardware and Stove business formerly conducted by Mrs. Lu Norris, Crete, Neb.

F. M. Bunn has bought the Hardware and Farm Implement business of William Aust, Pipestone, Minn. The new proprietor expects to enlarge the store.

S. M. McCoy is successor to McCoy & Blanchard in the Hardware, Stove and Harness business in Allerton, Iowa.

L. A. Arbuckle has disposed of his Hardware business in Sardinia, Ind., to Edwin Whalen, who will continue at the old stand.

W. G. Stoltz of Taylor, Wis., has purchased the Hardware and Stove business at Green Bay, Wis., formerly conducted by the late Thomas H. Burns. Mr. Stoltz has made a number of improvements in the store, with a view to rendering it more attractive and convenient.

Powell Hardware Company, Aiken, S. C., incorporated with a capital stock of \$25,000, will succeed Powell Bros., dealers in Hardware, Stoves, House Furnishing Goods, Agricultural Implements, Carriages, Harness, &c., on the 1st prox. The business is both wholesale and retail. Robert and James Powell are the incorporators.

Andrew Deidrich and Edward P. J. Wardian of Hodgford, Minn., have purchased the business of the Fairfield Hardware Company, Oakis, Minn., and will continue it under the style of Deidrich & Wardian.

Thiel, Dorman & King, dealers in Hardware, Stoves, Tinware, Farming Implements and Machinery, Glassware, Crockery, &c., Ritzville, Wash., have disposed of their business to the King Mercantile Company, who will continue at the same stand. The company are incorporated, with a capital stock of \$25,000, and the following officers: Fred. Thiel, president; W. W. King, secretary and treasurer; J. M. Comparet, general manager; W. W. King, Fred. Thiel and O. R. Haight, directors.

B. Heathman, dealer in Hardware, Stoves, Agricultural Implements, &c., Roff, I. T., has been succeeded by Heathman & Bunyard.

F. B. Orr has disposed of his business in Harper, Kan., to Fred. H. Dusser.

F. L. Freeman, Hardware merchant, of Waterloo, Iowa, has removed his business to more commodious quarters.

J. W. Dally has disposed of his Hardware, Stove and Sporting Goods stock, in Cleghorn, Iowa, to David Gowan, who continues at the old stand.

The store of G. B. Brubaker was recently destroyed in a large fire at Lykens, Pa. Mr. Brubaker saved most of his stock and his loss did not exceed \$2000. He will rebuild.

Miller & McWilliam have dissolved partnership in the Hardware business in Winthrop, Iowa, and W. B. Miller is successor under his own name.

Thomas B. Curtis has succeeded Curtis & Boyd in the Hardware, Stove and Farm Implement business in Woodburn, Iowa.

H. R. Teague has disposed of his business in Jay, Maine, for the purpose of engaging in the same line elsewhere.

Kingsley Bros., Norman, Neb., have disposed of their Hardware, Tinware and Wagon business to Taylor & Ackerman, who continue at the old stand.

F. W. Jackson, Clyde, Ohio, has sold his Hardware stock to Starr & Arner, who have removed the goods to their own store.

Stringfellow-Hume Hardware Company, incorporated with a capital stock of \$100,000, have succeeded the firm of Stringfellow & Hume, Amarillo, Texas. The company

will continue the wholesale and retail business in Hardware, Stoves, Agricultural Implements, Sporting Goods, Wagons, Buggies, Wind Mills, &c.

Miscellaneous Notes.

The World Belt Dressing.

The Engineers' Belt Dressing Company, 20 Lake street, Cleveland, Ohio, are manufacturing the World belt dressing, which is intended for leather and rubber belts. This dressing is in liquid form, and is referred to as the product of careful study and long experience. The manufacturers guarantee that the dressing contains no injurious ingredients whatever, and that it will not injure or harm any belt upon which it is used. They refer to the dressing as making belts soft and pliable, preventing hardening and cracking, and making slipping impossible. The preparation is put up in 10, 15 and 25 pound cans, 50 and 100 pound kegs, half barrels and barrels. A sample can of dressing will be sent free on application.

The King Fly Killer.

R. R. Montgomery & Co., Decatur, Ill., who manufacture the King fly killer, have made a number of improvements in the article for next year's trade, the most notable of which is the addition of a brass plate which is designed to prevent the breaking of the wire device where it is secured in the end of handle. Several of the longitudinal wires of the device have also been twisted together, so that the cross wires will not be whipped out of place by the action of the fly killer when in use.

J. B. Long Mfg. Company.

The J. B. Long Mfg. Company, 20 North Clark street, Chicago, manufacturers of cans, have added to their business a full line of japanned goods and coffee, tea and spice caddies and cans. Their business has so rapidly increased during the past year that they will build an addition to their factory, to be ready by February 1, which will double their capacity. They will also increase their capital stock to \$500,000.

Boys' Delight Saw and Buck.

C. E. Jennings & Co., 101 Reade street, New York, have put on the market a saw and buck called the Boys' Delight. A special feature of this outfit is that it is entirely practical and in no sense a toy. The length of the blade is 22 inches and the manufacturers say that it is made with the same precision as a 30-inch saw blade for professional use. Both saw and buck are painted a rich vermillion red, with the exception of the stretcher, which is tinned and japanned, both being collapsible so that they are contained in a double pasteboard box, the dimensions of which are 25 x 4½ x 3½ inches, making it convenient for shipment or placing on a store shelf.

Le Page's Photo and Library Paste.

Russia Cement Company, 103 Reade street, New York, manufacturers of Le Page's glues and adhesives, have recently put on the market photo and library paste. This

in glass jars with metal screw tops and also in collapsible tubes, both of which are in two sizes, to be retailed at 5 and 10 cents each. It is also packed in pints, quarts and gallons for large users. The bottles contain 2 and 4 ounces and are packed one dozen in a box, and also in ¼-gross cases for the jobbing trade. The tubes are put up in handsome partitioned double pasteboard boxes to hold a dozen tubes and arranged in easel style for display purposes on counter.

Frezo Ice Cream Freezer.

Dana & Co., Ninth and Sycamore streets, Cincinnati, Ohio, are now marketing for the ensuing season a new family size freezer, as here illustrated, which will be known as the Frezo. This article is of the one-motion type, the freezer being of improved form, having double scrapers secured to it in the same manner as this concern's Peerless Iceland freezer. The motive power is obtained by means of gears fastened to the can top, the rim on the bottom of the tub top projecting downward, thus protecting the gears from interference by salt or ice. A feature of this freezer is that the can can be revolved to harden the cream even after the dasher has been removed. Emphasis is laid on the fact



Frezo Ice Cream Freezer.

that the tub and can are full sized, the tub being made of first quality lumber and the can of strong and heavily coated tin plate. The tubs are neatly wrapped in heavy black paper and attractively labeled. This freezer is offered at a lower price than the Peerless Iceland, but the manufacturers say that it will produce cream ready for serving in less than four minutes. It is made in all sizes from 1 to 25 quarts capacity.

Curved Nose Plier.

Utica Drop Forge & Tool Company, Utica, N. Y., represented by the Smith & Hemenway Company, 296



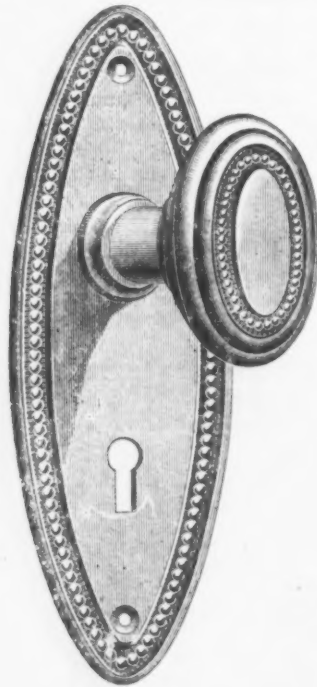
Bent or Curved Nose Plier.

preparation is referred to as manufactured from pure vegetable substances of high grade. It is white in color and suitable for general office work, mounting photographs, and also in connection with scrapbooks or for any purpose for which an adhesive is used. It is put up

Broadway, New York, are manufacturing the 888 bent or curved nose plier, here shown. This plier, both in material and workmanship, is of high grade, and is intended for the use of electricians, machinists, oculists, jewelers and also for operators in textile mills.

Wayne Design.

Russell & Erwin Mfg. Company, New Britain, Conn., and 43-47 Chambers street, New York, offer three designs in builders' hardware of uniform character, size and price, one of which, the Wayne design, is here illustrated, the preceding designs, Alden and Standish, having been previously shown in these columns. The goods are of wrought bronze metal, and the inside lock sets are regularly packed with rapid mortise easy spring wrought steel case locks made by this company. The accompanying articles in this design, in addition to in-



Wayne Design.

side sets, embrace knobs and escutcheons for both cylinder and bitted keyed front door locks, sliding door locks, push button, sash lift, push plate and drop handle drawer pulls. The three designs are made in various finishes and especial attention is drawn to the moderate price of the goods. They also publish in connection with each design an illustrated booklet describing the various details and illustrating the different parts and combinations of locks.

Combined Hoe, Hill and Drill Seeder No. 15.

An illustration is herewith given of the Iron Age combined single wheel hoe, hill and drill seeder, one of the new implements put on the market this season by the



Combined Hoe, Hill and Drill Seeder No. 15

Bateman Mfg. Company, Grenloch, N. J. The wheels are high and are made of steel. The frame is made of pipe coupled to malleable castings, of such design, it is remarked, as to give great strength. The implement

is referred to as being light and strong, and as sowing seeds in continuous rows or dropping in hills at 4, 6, 8, 12 or 24 inches apart. The catalogue of Iron Age implements for the season of 1901 is ready for distribution by the company.

John Kane has disposed of his Hardware business in Caldwell, Ohio, to C. C. Caldwell, who has had 17 years' experience as a traveling salesman.

CONTENTS.

	PAGE.
The Homestead 48-inch Universal Plate Mill. Illustrated.....	1
The Duty on Scrap Steel	2
Another Rod Mill Record.....	3
A National Standardizing Bureau.....	4
The Chicago Branch of Jones & Loughlins, Limited	5
Steam Turbines. Illustrated	6
Canadian News.....	15
The York Agricultural Trade.	16
A New Mill at Youngstown.....	16
The Crane Company and Their Employees	16
The Bessemer Road.....	17
The Waterbury Farrel Hydraulic Press and Compound Pump. Illus.	17
The Ship Subsidy Bill.....	18
The Uganda Bridge Contract	19
Central Pennsylvania News.....	19
Editorials:	
The Consolidation Supplement.....	20
The Progress of a Century.....	20
Checking Gold Export.....	21
The Right of Employers to Discharge Workmen.....	21
Personal	22
The Malleable Iron Trade in Eastern Pennsylvania	22
Otis, Bonnell & Co.....	22
Tin Plate and Merchant Pipe at Sharon	22
Manufacturing:	
Iron and Steel.....	23
Machinery.....	23
Hardware	24
Miscellaneous	24
The Iron and Metal Trades:	
A Comparison of Prices.....	25
Chicago.....	25
Philadelphia.....	26
Cincinnati.....	27
St. Louis.....	27
Cleveland.....	27
Pittsburgh.....	28
Birmingham.....	29
Metal Market.....	30
Iron and Industrial Stocks	31
The Philippine Tariff.....	32
The Federal Bankruptcy Law.....	33
Lake Iron Ore Matters.....	34
The New York Machinery Market.....	34
Machinery Wanted.....	35
Information Wanted.....	35
A New Sheet Mill.....	35
A Large Order for Blowing Engines.....	35
The Philadelphia Machinery Market.....	36
The Cleveland Machinery Market.....	38
New Lake Steamships.....	38
Hardware:	
The Sale of Seasonable Goods	39
The Holidays' Trade	39
The Trade Outlook.....	39
Special Reports	40
Notes on Prices.....	40
The Sportsman.....	42
January Work in the Hardware Store.....	42
Trade Organizations:	
New England Iron and Hardware Association.....	42
Wisconsin Retail Hardware Association	43
Southwestern Kansas and Oklahoma Implement and Hardware Dealers' Association	43
Refrigerator Notes.....	43
Requests for Catalogues, &c	43
A Modern Chain Plant	43
Hubbard & Co	44
Lang Cutlery Works	44
Trade Items.....	44
Calendars, &c.....	44
Simmons Hardware Company's Artistic Catalogue.....	44
Trade Winning Methods:	
Advertising Methods of a Philadelphia House. Illustrated...	45
Bulletins	45
A Stove Catalogue.....	45
A Cutlery Display.....	45
New York's Cycle Show.....	46
Price-Lists, Catalogues, &c.....	46
Among the Hardware Trade.....	46
Miscellaneous Notes:	
The World Belt Dressing.....	47
The King Fly Killer.....	47
J. B. Long Mfg. Company.....	47
Boys' Delight Saw and Buck.....	47
Le Page's Photo and Library Paste	47
Frez Ice Cream Freezer. Illustrated.....	47
Curved Nose Plier. Illustrated.....	47
Wayne Design. Illustrated.....	48
Combined Hoe, Hill and Drill Seeder No. 15. Illustrated.....	48
Current Hardware Prices.....	49
Current Metal Prices.....	56

Current Hardware Prices.

REVISED DECEMBER 24, 1900.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. They apply to such quantities of goods as are usually purchased by retail merchants. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 83½@83½@10% signifies that the price of the goods in question ranges from 83½ per cent. discount to 83½ and 10 per cent. discount.

Adjusters Blind—

Domestic, 7 doz. \$3.00...33½@33½@10%
North's...10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent...25&55
Taplin's Perfection...50%

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—American—

Eagle Anvil...7 7¼@7¾
Hay-Budden, Wrought...9@9¼
Horseshoe brand, Wrought...9¼@9½
Samson...7 7¼@7¾
Trenton, Wrought...7 7¼@7¾
Buck Pat. Trenton Wrought...7 7¼@7¾
Vulcan Wrought...7 7¼@7¾

Imported—

Armitage's Mouse Hole...8¼@9¼
Peter Wright's...9@9¼

Anvil, Vise and Drill—

Millers Falls Co., \$18.00...90%

Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Hull & Hoyt Co.
Lots of 1 doz...25%
Smaller Lots...20%
Lots of 3 doz...30%

Augers and Bits—

Conn. Double Spur...70@70¢
Boring Machine Augers...60¢@10¢
Car Bits, 12-in. twist...60¢@.50

Jennings' Pattern: Auger Bits—

Auger Bits...60¢@.50
Ford's Auger and Car Bits...40¢@10¢@10¢@10%

Forster Pat. Auger Bits...30%
C. E. Jennings & Co.
No. 10 ext. lip, R. Jennings' list...40%
No. 30, R. Jennings' list...50%

Russell Jennings...25&10¢
L'Hommiedieu Car Bits 1&10¢@15¢@10¢
Pugh's Black...20%
Pugh's Jennings' Pattern...30%

Snell's Auger Bits...60%
Snell's Bell Hangers' Bits...50%
Snell's Car Bits, 12-in. twist...60%
Wright's Jennings Bits (R. Jennings' list)...50%

Bit Stock Drills—

Standard List...65¢@70%

Expansive Bits—

Clark's small, 1½; large, \$20...50&10%
Larvigne's Clark's Pattern, No. 1, 7 doz. \$20; No. 2, \$18...50&10%
C. E. Jennings & Co., Snell's Pat...33½¢
Swan's...60%

Gimlet Bits—

Common Double Out, gro. \$2.00@2.75
German Pattern...gro. \$2.25@5.00
Double Out, makers' lists...50¢@50¢@10%

Hollow Augers—

Ames...25&10%
Boanay's Adjustable, 7 doz...15.55
New Patent...25&10%
Universal...30%

Ship Augers and Bits—

Ford's...40%
Snell's...40%
C. E. Jennings & Co.
L'Hommiedieu's...15&10%
Watrous'...40%

Awl Hafts, See Hafts, Awl.

Awls—

Brad Awls:
Handled...gro. \$1.75@3.10
Unhandl'd, Shouldered, gro. \$1.65@86¢
Unhandl'd, Patent...gro. 60¢@70¢

Peg Awls:
Unhandl'd, Patent...gro. \$1@34¢
Unhandl'd, Shouldered, gro. \$1.65@70¢
Scratch Awls:
Handled, Common...gro. \$3.50@4.00
Handled, Socket, gro. \$11.50@12.00

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

First Quality, best brands...\$6.25@6.50
First Quality, other brands...\$6.00@6.25
Jobbers' Special Brands:
Good Quality...\$5.00@5.50
Best Quality...\$6.25

Cheap, Handled Axes...\$5.50@5.75
Beveled, add 25¢ doz.

Axle Grease—See Grease, Axle.

Axles—

Concord, Loose Collar...4½¢
Concord, Solid Collar...5¢
No. 1 Common...3¢@3½¢
No. 1½ Com. New Style...3½¢@4¢
No. 2, Solid Collar...3½¢@4¢
Nos. 7, 8, 11 to 14...75¢@10%
Nos. 15 to 18...60¢@10%
Nos. 19 to 22...75¢@75¢@10%

Boxes, Axle—

Common and Concord, not turned...15¢
Common and Concord, turned...15¢
Half Patent...15¢
Full Patent...15¢

Balances—Sash—

Caldwell new list...50%
Pulman's...60%

Spring—

Spring Balances...60¢@50¢@10%
Chatillon's Light Spg. Balances...40¢@10%
Chatillon Straight Balances...40%
Chatillon Circular Balances...50%
Chatillon's Large Dial...50%
Fetouse...50%

Barb Wire—Wire, Barb.

Steel Crowbars, 10 to 10 lb., per lb...\$3.40

Beams, Scale—

Scale Beams, List Jan. 12, '82...\$2.50@10%
Chatillon's No. 1...30%
Chatillon's No. 2...40%

Beaters—Egg—

Standard Co.:
No. 5 Steel Handle Diver...\$0.50
No. 10 Cast Handle Diver...\$0.80
No. 10 Steel Handle Diver...\$0.80
No. 15 Extra Heavy Steel Handle...\$1.50

Rival, 7 gro...\$1.00
Taplin Mfg. Co.:
No. 50 Small Family size...\$0.50
No. 100 Regular Family size...\$0.80
No. 102 Regular Family size, tinned...\$0.50
No. 150 Large Family size...\$1.50
No. 152 Large Family size, tinned...\$1.70

Lyon's, Standard size...\$0.75
Wonder (S. S. & Co.)...\$0.75
C. E. Jennings & Co., Blacksmith...60¢@10%
C. E. Jennings & Co., Hand...33½¢

Bellows—

Blacksmith, Standard List...70¢@70¢@10%
C. E. Jennings & Co., Blacksmith...60¢@10%
C. E. Jennings & Co., Hand...33½¢

Blacksmiths—

Inch...\$1.50 \$1.75 \$2.00 \$2.25 \$2.50 \$2.75 \$3.00 \$3.25 \$3.50 \$3.75 \$4.00 \$4.25 \$4.50 \$4.75 \$5.00 \$5.25 \$5.50 \$5.75 \$6.00 \$6.25 \$6.50 \$6.75 \$7.00 \$7.25 \$7.50 \$7.75 \$8.00 \$8.25 \$8.50 \$8.75 \$9.00 \$9.25 \$9.50 \$9.75 \$10.00 \$10.25 \$10.50 \$10.75 \$11.00 \$11.25 \$11.50 \$11.75 \$12.00 \$12.25 \$12.50 \$12.75 \$13.00 \$13.25 \$13.50 \$13.75 \$14.00 \$14.25 \$14.50 \$14.75 \$15.00 \$15.25 \$15.50 \$15.75 \$16.00 \$16.25 \$16.50 \$16.75 \$17.00 \$17.25 \$17.50 \$17.75 \$18.00 \$18.25 \$18.50 \$18.75 \$19.00 \$19.25 \$19.50 \$19.75 \$20.00 \$20.25 \$20.50 \$20.75 \$21.00 \$21.25 \$21.50 \$21.75 \$22.00 \$22.25 \$22.50 \$22.75 \$23.00 \$23.25 \$23.50 \$23.75 \$24.00 \$24.25 \$24.50 \$24.75 \$25.00 \$25.25 \$25.50 \$25.75 \$26.00 \$26.25 \$26.50 \$26.75 \$27.00 \$27.25 \$27.50 \$27.75 \$28.00 \$28.25 \$28.50 \$28.75 \$29.00 \$29.25 \$29.50 \$29.75 \$30.00 \$30.25 \$30.50 \$30.75 \$31.00 \$31.25 \$31.50 \$31.75 \$32.00 \$32.25 \$32.50 \$32.75 \$33.00 \$33.25 \$33.50 \$33.75 \$34.00 \$34.25 \$34.50 \$34.75 \$35.00 \$35.25 \$35.50 \$35.75 \$36.00 \$36.25 \$36.50 \$36.75 \$37.00 \$37.25 \$37.50 \$37.75 \$38.00 \$38.25 \$38.50 \$38.75 \$39.00 \$39.25 \$39.50 \$39.75 \$40.00 \$40.25 \$40.50 \$40.75 \$41.00 \$41.25 \$41.50 \$41.75 \$42.00 \$42.25 \$42.50 \$42.75 \$43.00 \$43.25 \$43.50 \$43.75 \$44.00 \$44.25 \$44.50 \$44.75 \$45.00 \$45.25 \$45.50 \$45.75 \$46.00 \$46.25 \$46.50 \$46.75 \$47.00 \$47.25 \$47.50 \$47.75 \$48.00 \$48.25 \$48.50 \$48.75 \$49.00 \$49.25 \$49.50 \$49.75 \$50.00 \$50.25 \$50.50 \$50.75 \$51.00 \$51.25 \$51.50 \$51.75 \$52.00 \$52.25 \$52.50 \$52.75 \$53.00 \$53.25 \$53.50 \$53.75 \$54.00 \$54.25 \$54.50 \$54.75 \$55.00 \$55.25 \$55.50 \$55.75 \$56.00 \$56.25 \$56.50 \$56.75 \$57.00 \$57.25 \$57.50 \$57.75 \$58.00 \$58.25 \$58.50 \$58.75 \$59.00 \$59.25 \$59.50 \$59.75 \$60.00 \$60.25 \$60.50 \$60.75 \$61.00 \$61.25 \$61.50 \$61.75 \$62.00 \$62.25 \$62.50 \$62.75 \$63.00 \$63.25 \$63.50 \$63.75 \$64.00 \$64.25 \$64.50 \$64.75 \$65.00 \$65.25 \$65.50 \$65.75 \$66.00 \$66.25 \$66.50 \$66.75 \$67.00 \$67.25 \$67.50 \$67.75 \$68.00 \$68.25 \$68.50 \$68.75 \$69.00 \$69.25 \$69.50 \$69.75 \$70.00 \$70.25 \$70.50 \$70.75 \$71.00 \$71.25 \$71.50 \$71.75 \$72.00 \$72.25 \$72.50 \$72.75 \$73.00 \$73.25 \$73.50 \$73.75 \$74.00 \$74.25 \$74.50 \$74.75 \$75.00 \$75.25 \$75.50 \$75.75 \$76.00 \$76.25 \$76.50 \$76.75 \$77.00 \$77.25 \$77.50 \$77.75 \$78.00 \$78.25 \$78.50 \$78.75 \$79.00 \$79.25 \$79.50 \$79.75 \$80.00 \$80.25 \$80.50 \$80.75 \$81.00 \$81.25 \$81.50 \$81.75 \$82.00 \$82.25 \$82.50 \$82.75 \$83.00 \$83.25 \$83.50 \$83.75 \$84.00 \$84.25 \$84.50 \$84.75 \$85.00 \$85.25 \$85.50 \$85.75 \$86.00 \$86.25 \$86.50 \$86.75 \$87.00 \$87.25 \$87.50 \$87.75 \$88.00 \$88.25 \$88.50 \$88.75 \$89.00 \$89.25 \$89.50 \$89.75 \$90.00 \$90.25 \$90.50 \$90.75 \$91.00 \$91.25 \$91.50 \$91.75 \$92.00 \$92.25 \$92.50 \$92.75 \$93.00 \$93.25 \$93.50 \$93.75 \$94.00 \$94.25 \$94.50 \$94.75 \$95.00 \$95.25 \$95.50 \$95.75 \$96.00 \$96.25 \$96.50 \$96.75 \$97.00 \$97.25 \$97.50 \$97.75 \$98.00 \$98.25 \$98.50 \$98.75 \$99.00 \$99.25 \$99.50 \$99.75 \$100.00 \$100.25 \$100.50 \$100.75 \$101.00 \$101.25 \$101.50 \$101.75 \$102.00 \$102.25 \$102.50 \$102.75 \$103.00 \$103.25 \$103.50 \$103.75 \$104.00 \$104.25 \$104.50 \$104.75 \$105.00 \$105.25 \$105.50 \$105.75 \$106.00 \$106.25 \$106.50 \$106.75 \$107.00 \$107.25 \$107.50 \$107.75 \$108.00 \$108.25 \$108.50 \$108.75 \$109.00 \$109.25 \$109.50 \$109.75 \$110.00 \$110.25 \$110.50 \$110.75 \$111.00 \$111.25 \$111.50 \$111.75 \$112.00 \$112.25 \$112.50 \$112.75 \$113.00 \$113.25 \$113.50 \$113.75 \$114.00 \$114.25 \$114.50 \$114.75 \$115.00 \$115.25 \$115.50 \$115.75 \$116.00 \$116.25 \$116.50 \$116.75 \$117.00 \$117.25 \$117.50 \$117.75 \$118.00 \$118.25 \$118.50 \$118.75 \$119.00 \$119.25 \$119.50 \$119.75 \$120.00 \$120.25 \$120.50 \$120.75 \$121.00 \$121.25 \$121.50 \$121.75 \$122.00 \$122.25 \$122.50 \$122.75 \$123.00 \$123.25 \$123.50 \$123.75 \$124.00 \$124.25 \$124.50 \$124.75 \$125.00 \$125.25 \$125.50 \$125.75 \$126.00 \$126.25 \$126.50 \$126.75 \$127.00 \$127.25 \$127.50 \$127.75 \$128.00 \$128.25 \$128.50 \$128.75 \$129.00 \$129.25 \$129.50 \$129.75 \$130.00 \$130.25 \$130.50 \$130.75 \$131.00 \$131.25 \$131.50 \$131.75 \$132.00 \$132.25 \$132.50 \$132.75 \$133.00 \$133.25 \$133.50 \$133.75 \$134.00 \$134.25 \$134.50 \$134.75 \$135.00 \$135.25 \$135.50 \$135.75 \$136.00 \$136.25 \$136.50 \$136.75 \$137.00 \$137.25 \$137.50 \$137.75 \$138.00 \$138.25 \$138.50 \$138.75 \$139.00 \$139.25 \$139.50 \$139.75 \$140.00 \$140.25 \$140.50 \$140.75 \$141.00 \$141.25 \$141.50 \$141.75 \$142.00 \$142.25 \$142.50 \$142.75 \$143.00 \$143.25 \$143.50 \$143.75 \$144.00 \$144.25 \$144.50 \$144.75 \$145.00 \$145.25 \$145.50 \$145.75 \$146.00 \$146.25 \$146.50 \$146.75 \$147.00 \$147.25 \$147.50 \$147.75 \$148.00 \$148.25 \$148.50 \$148.75 \$149.00 \$149.25 \$149.50 \$149.75 \$150.00 \$150.25 \$150.50 \$150.75 \$151.00 \$151.25 \$151.50 \$151.75 \$152.00 \$152.25 \$152.50 \$152.75 \$153.00 \$153.25 \$153.50 \$153.75 \$154.00 \$154.25 \$154.50 \$154.75 \$155.00 \$155.25 \$155.50 \$155.75 \$156.00 \$156.25 \$156.50 \$156.75 \$157.00 \$157.25 \$157.50 \$157.75 \$158.00 \$158.25 \$158.50 \$158.75 \$159.00 \$159.25 \$159.50 \$159.75 \$160.00 \$160.25 \$160.50 \$160.75 \$161.00 \$161.25 \$161.50 \$161.75 \$162.00 \$162.25 \$162.50 \$162.75 \$163.00 \$163.25 \$163.50 \$163.75 \$164.00 \$164.25 \$164.50 \$164.75 \$165.00 \$165.25 \$165.50 \$165.75 \$166.00 \$166.25 \$166.50 \$166.75 \$167.00 \$167.25 \$167.50 \$167.75 \$168.00 \$168.25 \$168.50 \$168.75 \$169.00 \$169.25 \$169.50 \$169.75 \$170.00 \$170.25 \$170.50 \$170.75 \$171.00 \$171.25 \$171.50 \$171.75 \$172.00 \$172.25 \$172.50 \$172.75 \$173.00 \$173.25 \$173.50 \$173.75 \$174.00 \$174.25 \$174.50 \$174.75 \$175.00 \$175.25 \$175.50 \$175.75 \$176.00 \$176.25 \$176.50 \$176.75 \$177.00 \$177.25 \$177.50 \$177.75 \$178.00 \$178.25 \$178.50 \$178.75 \$179.00 \$179.25 \$179.50 \$179.75 \$180.00 \$180.25 \$180.50 \$180.75 \$181.00 \$181.25 \$181.50 \$181.75 \$182.00 \$182.25 \$182.50 \$182.75 \$183.00 \$183.25 \$183.50 \$183.75 \$184.00 \$184.25 \$184.50 \$184.75 \$185.00 \$185.25 \$185.50 \$185.75 \$186.00 \$186.25 \$186.50 \$186.75 \$187.00 \$187.25 \$187.50 \$187.75 \$188.00 \$188.25 \$188.50 \$188.75 \$189.00 \$189.25 \$189.50 \$189.75 \$190.00 \$190.25 \$190.50 \$190.75 \$191.00 \$191.25 \$191.50 \$191.75 \$192.00 \$192.25 \$192.50 \$192.75 \$193.00 \$193.25 \$193.50 \$193.75 \$194.00 \$194.25 \$194.50 \$194.75 \$195.00 \$195.25 \$195.50 \$195.75 \$196.00 \$196.25 \$196.50 \$196.75 \$197.00 \$197.25 \$197.50 \$197.75 \$198.00 \$198.25 \$198.50 \$198.75 \$199.00 \$199.25 \$199.50 \$199.75 \$200.00 \$200.25 \$200.50 \$200.75 \$201.00 \$201.25 \$201.50 \$201.75 \$202.00 \$202.25 \$202.50 \$202.75 \$203.00 \$203.25 \$203.50 \$203.75 \$204.00 \$204.25 \$204.50 \$204.75 \$205.00 \$205.25 \$205.50 \$205.75 \$206.00 \$206.25 \$206.50 \$206.75 \$207.00 \$207.25 \$207.50 \$207.75 \$208.00 \$208.25 \$208.50 \$208.75 \$209.00 \$209.25 \$209.50 \$209.75 \$210.00 \$210.25 \$210.50 \$210.75 \$211.00 \$211.25 \$211.50 \$211.75 \$212.00 \$212.25 \$212.50 \$212.75 \$213.00 \$213.25 \$213.50 \$213.75 \$214.00 \$214.25 \$214.50 \$214.75 \$215.00 \$215.25 \$215.50 \$215.75 \$216.00 \$216.25 \$216.50 \$216.75 \$217.00 \$217.25 \$217.50 \$217.75 \$218.00 \$218.25 \$218.50 \$218.75 \$219.00 \$219.25 \$219.50 \$219.75 \$220.00 \$220.25 \$220.50 \$220.75 \$221.00 \$221.25 \$221.50 \$221.75 \$222.00 \$222.25 \$222.50 \$222.75 \$223.00 \$223.25 \$223.50 \$223.75 \$224.00 \$224.25 \$224.50 \$224.75 \$225.00 \$225.25 \$225.50 \$225.75 \$226.00 \$226.25 \$226.50 \$226.75 \$227.00 \$227.25 \$227.50 \$227.75 \$228.00 \$228.25 \$228.50 \$228.75 \$229.00 \$229.25 \$229.50 \$229.75 \$230.00 \$230.25 \$230.50 \$230.75 \$231.00 \$231.25 \$231.50 \$231.75 \$232.00 \$232.25 \$232.50 \$232.75 \$233.00 \$233.25 \$233.50 \$233.75 \$234.00 \$234.25 \$234.50 \$234.75 \$235.00 \$235.25 \$235.50 \$235.75 \$236.00 \$236.25 \$236.50 \$236.75 \$237.00 \$237.25 \$237.50 \$237.75 \$238.00 \$238.25 \$238.50 \$238.75 \$239.00 \$239.25 \$239.50 \$239.75 \$240.00 \$240.25 \$240.50 \$240.75 \$241.00 \$241.25 \$241.50 \$241.75 \$242.00 \$242.25 \$242.50 \$242.75 \$243.00 \$243.25 \$243.50 \$243.75 \$244.00 \$244.25 \$244.50 \$244.75 \$245.00 \$245.25 \$245.50 \$245.75 \$246.00 \$246.25 \$246.50 \$246.75 \$247.00 \$247.25 \$247.50 \$247.75 \$248.00 \$248.25 \$248.50 \$248.75 \$249.00 \$249.25 \$249.50 \$249.75 \$250.00 \$250.25 \$250.50 \$250.75 \$251.00 \$251.25 \$251.50 \$251.75 \$252.00 \$252.25 \$252.50 \$252.75 \$253.00 \$253.25 \$253.50 \$253.75 \$254.00 \$254.25 \$254.50 \$254.75 \$255.00 \$255.25 \$255.50 \$255.75 \$256.00 \$256.25 \$256.50 \$256.75 \$257.00 \$257.25 \$257.50 \$257.75 \$258.00 \$258.25 \$258.50 \$258.75 \$259.00 \$259.25 \$259.50 \$259.75 \$260.00 \$260.25 \$260.50 \$260.75 \$261.00 \$261.25 \$261.50 \$261.75 \$262.00 \$262.25 \$262.50 \$262.75 \$263.00 \$263.25 \$263.50 \$263.75 \$264.00 \$264.25 \$264.50 \$264.75 \$265.00 \$265.25 \$265.50 \$265.75 \$266.00 \$266.25 \$266.50 \$266.75 \$267.00 \$267.25 \$267.50 \$267.75 \$268.00 \$268.25 \$268.50 \$268.75 \$269.00 \$269.25 \$269.50 \$269.75 \$270.00 \$270.25 \$270.50 \$270.75 \$271.00 \$271.25 \$271.50 \$271.75 \$272.00 \$272.25 \$272.50 \$272.75 \$273.00 \$273.25 \$273.50 \$273.75 \$274.00 \$274.25 \$274.50 \$274.75 \$275.00 \$275.25 \$275.50 \$275.75 \$276.00 \$276.25 \$276.50 \$276.75 \$277.00 \$277.25 \$277.50 \$277.75 \$278.00 \$278.25 \$278.50 \$278.75 \$279.00 \$279.25 \$279.50 \$279.75 \$280.00 \$280.25 \$280.50 \$280.75 \$281.00 \$281.25 \$281.50 \$281.75 \$282.00 \$282.25 \$282.50 \$282.75 \$283.00 \$283.25 \$283.50 \$283.75 \$284.00 \$284.25 \$284.50 \$284.75 \$285.00 \$285.25 \$285.50 \$285.75 \$286.00 \$286.25 \$286.50 \$286.75 \$287.00 \$287.25 \$287.50 \$287.75 \$288.00 \$288.25 \$288.50 \$288.75 \$289.00 \$289.25 \$289.50 \$289.75 \$290.00 \$290.25 \$290.50 \$290.75 \$291.00 \$291.25 \$291.50 \$291.75 \$292.00 \$2

Cost and Hat. Stowell's

Coat and Hat, Reading.....	70¢
Coat and Hat, Sargent's List.....	45¢
Coat and Hat, Wrightsville.....	85¢
Harness, Reading List.....	70¢
Wire—	
Belt.....	80¢
Atlas, Coat and Hat:	
Slack.....	75¢

10 Case Lots.....
Car Harness.....

Wire Coat and Hat:	
Acme.....	50¢10¢5
B. B.....	50¢10¢5
V Brace, Chief and Czar.....	50¢10¢5
Gem.....	60
Bright Wire Goods—See Wire.	
Wrought Iron—	

Box, 6 in., per doz. \$1
10 in. 22.00

10 in., \$3.00.
Cotton..... doz. \$1.05 @ 1.15
Wrought Staples, Hooks, &c.—
See Wrought Goods.
Miscellaneous—
Bush, Light, doz. \$5.50; Medium,
\$6.00; Heavy, \$8.50.

Grass.....	No.	36.
		1

Grass.....Nos.	1	2	3	4
Best.....	\$1.50	1.75	2.00	
Common.....	\$1.40	1.60	1.80	1.75
Potato and Manure.....				1b. 1.34
Whistletræ.....				1b. 1.34
Hooks and Eyes:				
Brass.....	60¢	10¢	10¢	70¢
Iron.....				

Malleable Iron ..

Drugs.....60¢ 10¢ 10¢ 70¢
Malleable Iron.....70¢ 50¢ 70¢ 10¢
Covert Saddlery Works' Self Locking
Gate and Door Hook.....60¢ 10¢
Crown Picture.....50¢ 10¢
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.
Horse Nails—See Nails, Horse
Horseshoes—

Horseshoes—
See *Shoes, Horse*

Hose Rubber—
Garden Hose, 3/4-inch:
Competition.....ft. 4 1/2 4 1/2

4-ply Standard...

3-ply standard ft. 8 ② 8
4-ply Standard.....ft. 8 ② 9
3-ply extraft. 9 ② 10
4-ply extraft. 11 ② 12
Cotton Garden, 3/4-in., coupled :
Low Grade.....

Fair quality.....

Irons— Sad—
 From 4 to 10.....lb. 50¢ 51¢
 B. B. Sad Irons.....lb. 3½¢ 3½¢
 Chinese Laundry.....lb. 50¢ 51¢
 Chinese Sad.....lb. 3½¢ 3½¢
 Mrs. Potts', per set:

Mrs. Potts', per set :
Nos. 50 55

Mrs. Potts, per set :
Nos. 50 55 60 65
72c 69c 83c 79c
New England Pressing, lb. 34c 34c
Soldering
Soldering Coppers, 1 & 1 1/2 lb. \$1 @
25c.; 1 lb., 19 @ 21
Covert Mfg. Co. 20 @ 22
Pinking--
Pinking Irons.....doz. 50 @ 60
Jack Screws--See Screens.
Jack's Wagon--

Covert Mfg. Co., Steel
Daisy.....

Cover (fg. Co. Steel.....	55c
Daisy.....	70
Lockport.....	40@40c
Victoria.....	70
Lane's Steel.....	40

Kettles—
 Brass, Spun, Plain..... \$0@25
 Enameled and Cast Iron—See War
 Hollno.

Knife Sharpeners—
 See Sharpeners, Knife.

Knives—
 Butcher, Shoe, &c.—
 Dick Butcher Knives..... 40
 Foster Bros. Butcher, &c..... 40

Nichols' Butcher Knife
Hay and Straw—See A

Nichols' Butcher Knives.....50
Hay and Straw—See *Hay Knives*.
Corn—
#% Ft. Madison Cut-Easy, # dos.....\$3.2
% Withington Acme, # dos., \$2.65; Dent,
% \$2.75; Adj. Serrated, \$3.20; Serr-
% ated, \$2.10; Yankee No. 1, \$1.50;
% Yankee No. 2, \$1.15.
% **Drawing—**

57	Standard List.....
58	Adjustable Handle...

Standard List.....	70&5@70&10
Adjustable Handle.....	25@38
Bradley's.....	90
C. E. Jennings & Co. Nos. 45, 46.....	40&10
Jennings & Griffin.....	60&10
Swan's.....	70&10

Watrous.....
L. & L. J. White.....

Watrous.....	80¢10¢40
L. & I. J. White.....	20¢5¢20
Cantelo's Folding.....	50¢50¢5

Hay and Straw

00	Iwan's Sickle Edge...
80	Lightning...

00	Iwan's Sickle Edge.....	♀ doz.	\$11.50
80	Lightning.....		\$7.50
00	Maine.....	♀ doz.	\$8.50
20	Mincing—		
00	Buffalo.....	♀ gro.	\$15.00

Miscella

Miscellaneous—
Farriers' doz. \$1.00@3.00
Worstenholm's ♀ doz. \$3.00@3.10
Knobs—

Base, 2 1/4-inch, Bl
Rubber tip, gro.,

Bass, 1/4-inch, Birch, or Maple,	
Rubber tip, gro.....	\$1.25 @ 1 lb.
Carriage tip, Jap, all sizes.....	30¢ @ 3 doz.
Door, Mineral.....	doz. 60¢ @ 6 doz.
Door, Por. Jap'd.....	doz. 70¢ @ 7 doz.
Door, Por. Nickel.....	doz. \$2.00 @ 2 doz.
Bardsley's Wood Door, Shutter, &c., 11'	
Picture Sargent's.....	60¢ @ 1 lb.
Snow's Victor.....	50¢ @ 1 lb.

Ladders, St

Ladders, Step-				
Handy Ladder Works:				
Extended		Shipped		Shipped
Length.	Length.	Ready for	Per doz.	K. D.
Feet.	Feet.	Use.	Per doz.	Per doz.
4	7		\$16.00	\$14.00
5	9		12.50	17.00
6	11		24.50	21.00
7	13		29.50	25.00
8	16		84.00	29.00
9	17		30.00	32.00
10	19		43.00	35.00
11	21		46.50	40.00
12	23		51.00	45.00

Ladies—Melting—

L. & G. Mfg. Co. 40¢
P. S. & W. 40¢
Reading 40¢
Burgent 40¢

Lanterns—Tubular—

Regular Tubular 40¢
Side Lift Tubular 40¢
Square Lift Tubular 40¢
Other Styles 40¢

Bull's Eye Police—

No. 1, 3 1/4 inch 40¢
No. 2, 3 inch 40¢

Latches, Thumb—

Roggin's Latches 40¢

Lawn Mowers—

See Mowers, Lawn.

Leaders, Cattle—

Small 40¢
Covert Mfg. Co. 40¢

Lemon Squeezers—

See Squeezers, Lemon.

Lifters, Transom—

Dickson's 40¢
3 x 4 ft. x 1/2" 40¢
Other sizes, iron 40¢
Other sizes, Brass and Bronze 40¢

Lines—

Wire Clothes, Nos. 13, 19, 20 40¢
100 feet 40¢
75 feet 40¢

Osawan Mills—

Crown Solid Braided Chalk 40¢
Mason's, No. 0 to No. 5 40¢
Bamson Cordage Works 40¢
Solid Braided Chalk, No. 0 to No. 5 40¢
Silver Lake Braided Chalk, No. 0 to No. 5 40¢
No. 1, \$6.50; No. 2, \$7.00; No. 3, \$7.50
Payson's Signal (new list) 40¢
Reading 40¢

Locks—

Cabinet—

Cabinet Locks 40¢
Door Locks, Latches, &c. 40¢

[Net prices are very often made on these goods.]

Reading Hardware Co. 40¢
R. & E. Mfg. Co. 40¢
Burgent & Co. 40¢
Bismarck Hardware Co. 40¢
Snow's Victor 40¢

Elevator—

Stowell's 40¢

Padlocks—

Wrought Iron, list Dec. 5, '97, 75¢ 10¢
Dog Collar, S. B. Co. 40¢
R. & E. Mfg. Co. Wrt Steel and Brass, 50¢
B. & C. Co. 40¢

Sash, &c.—

Fitch's Bronze and Brass 40¢
Fitch's Iron 40¢
Fitch's Patent 40¢
Definger's Automatic 40¢
Payson's Perfery (new list) 40¢
Reading 40¢

Machines—

Boring—

Without Augers, Upright, Angular.

Improved No. 2 40¢
Improved No. 4 40¢
Improved No. 5 40¢
Jennings 40¢
Miller's Falls 40¢
O'Neill's, Rice's Pat. 2.50 40¢
Swan's, No. 500 40¢

Hoisting—

Moore's Anti-Friction Differential Pulley Block 40¢
Moore's Hand Hoist, with Lock Brake, 20¢

Ice Cutting—

Chandler's 40¢

Washing—

Wayne American 40¢
Western Star, No. 2, 28.00 40¢
Western Star, No. 3, 30.00 40¢
St. Louis, No. 41, 60.00 40¢

Mallets—

Hickory 40¢
Lignumvitae 40¢
Timbers, Hickory and Applewood 40¢
Fiber Head Stearns' 40¢

Mats—

Door—

Elastic Steel (W. G. Co.) 40¢

Mattocks—

See Picks and Mattocks.

Meat Cutters—

See Cutters, Meat.

Milk Cans—

See Cans, Milk.

Mills—Coffee—

Box and Side, list Jan. 1, '88, 50¢ 10¢ 5¢ 60¢ 5¢

Net prices are often made on some goods which are lower than above amounts.

Enterprise Mfg. Co. 40¢
National, list Jan. 1, '94 40¢
Parker's Columbia and Victor 40¢
Parker's Box and Side 40¢
Swift, 1 case Bros. 40¢

Mining Knives—

See Knives, Mining.

Molasses Gates—

See Gates, Molasses.

Money Drawers—

See Drawers, Money.

Mowers, Lawn—

Net prices are generally quoted.

Cheap all sizes, \$2.00 to \$10.00

Good all sizes, \$2.50 to \$10.50

High Grade L. 25 4.50 1.75 5.00

Pennsylvania and Continental, 60¢ 10¢ 5¢

Quaker City 70¢ 5¢

Great American 70¢ 5¢

Philadelphia 70¢ 5¢

Styles M. S. C. K. T. 70¢ 5¢

Style A, all Steel 60¢ 10¢

Style E, Low Wheel 60¢ 10¢

Style K, High Wheel 70¢ 10¢ 5¢

Drexel and Gold Coin, low list 50¢ 5¢

Nails—

Cut and Wire. See Trade Report.

Wire Nail and Brads, Papered.

List July 20, 1899, 85¢ 85¢ 10¢

Hungarian, Finishing, Upholsterers', &c. See Tacks

Horse—

Nos. 7 8 9 10

A. C. 25¢ 23¢ 22¢ 21¢ 21¢ 40¢ 5¢

Ausable 25¢ 23¢ 22¢ 21¢ 21¢ 40¢ 5¢

Capwell, 19¢ 18¢ 17¢ 16¢ 16¢ 10¢ 5¢

C. B. K. 25¢ 25¢ 22¢ 21¢ 21¢ 40¢

Champion, 18¢ 18¢ 25¢ 24¢ 23¢ 40¢ 5¢

Clinton, 19¢ 17¢ 16¢ 15¢ 14¢ 40¢ 5¢

Maud S. 25¢ 23¢ 22¢ 21¢ 21¢ 40¢ 5¢

Neponset, 23¢ 21¢ 20¢ 19¢ 18¢ 40¢

Putnam, 23¢ 21¢ 20¢ 19¢ 18¢ 39¢ 4¢

Standard, 23¢ 21¢ 20¢ 19¢ 18¢ 40¢

Star, 23¢ 21¢ 20¢ 19¢ 18¢ 35¢ 5¢

Vulcan, 23¢ 21¢ 20¢ 19¢ 18¢ 25¢ 10¢

Amer. can, Nos. 1 to 10 40¢ 5¢

Picture—

1 1/2 x 2 1/2 3 1/2 4 1/2 in.

Brass Head, 1.50 1.00 1.00 1.00 1.00

Por. Head, 1.10 1.10 1.10 1.10 1.10

Nippers, See Pliers and Nippers.

Nut Crackers—

See Crackers, Nut.

Nuts—

List Feb. 1, '99.

Cold Punched Off

Mfrs. or U. S. Standard, list.

Hexagon, plain 5.00 to 6.00

Square, plain 5.00 to 6.00

Square, C. T. & R. 5.70 to 5.80

Hexagon, C. T. & R. 6.50 to 6.60

Hot Pressed:

Mfrs., U. S. or Nar. Gauge Stan'd.

Square Blank or Tapped, 5.90 to 6.00

Hexagon Blank or Tapped, 6.10 to 6.20

Oakum—

Best or Government lb. 6 1/4 c

Navy lb. 5 c

U. S. Navy lb. 5 c

Plumbers' Spun Navy lb. 5 c

In carload lots 1/4 lb. off f.o.b. New York.

Oil, Axle—

Snow Flake:

1 pt. cans, per doz. \$3.00

1 qt. cans, per doz. \$4.50

1 gal. cans, per doz. \$9.00

5 gal. cans, per doz. \$45.00

Oil Tanks—See Tanks, Oil.**Oilers—**

Brass and Copper 10¢ 10¢ 50¢

Tin or Steel 60¢ 10¢ 65¢

Zinc 60¢ 10¢ 65¢

Malleable, Hammers' Improved, No. 1, \$3.40; No. 2, \$4.40; No. 3, \$4.40

Malleable, Hammers' Old Pattern, same list

Wilmot & Hobbs Mfg. Co. 70¢ 70¢ 10¢

Spring Bottom Cans 70¢ 70¢ 10¢

Railroad Oilers etc. 60¢ 60¢ 10¢

Oponers—

Can—

French doz. 35¢

Iron Handle, doz. 25¢ 27¢

Sprague, Iron Handle, per doz. 25¢ 50¢

Sardine Scissors, doz. 1.75 to \$5.00

Tip Top per doz. \$1.75

National, 7 gro. \$1.75 to \$2.00

Stowell's per doz. 40¢ 45¢

Waldorf, 7 gro. \$9.00

Egg—

Nickel Plate per doz. \$2.00

Silver Plate per doz. \$4.00

Packing—**Rubber—**

Standard, fair quality 70¢ 10¢ 75¢

Inferior quality 75¢ 10¢ 80¢

Extra 60¢ 65¢ 60¢ 10¢ 5¢

Jenkins' Standard, 7 80¢ 25¢ 25¢ 5¢

Miscellaneous—

American Packing 9¢ 10¢ 10¢

Cotton Packing 13¢ 15¢ 10¢

Italian Packing 10¢ 11¢ 10¢

Jute 6¢ 10¢ 10¢

Russia Packing 12¢ 13¢ 10¢

Pails—

Creamery—

E. S. & Co., with gauges, No. 1 \$6.50;

No. 2, \$6.75 per doz.

Galvanized—

Price per gro.

Inch. 10 12 14

Water, Regular 18.00 21.00 24.00

Water, Heavy 22.00 25.00 28.00

Fire, Rd. Bottom 31.00 33.00 35.00

Well 27.00 29.00 31.00

Pans—

Dripping—

Standard List 65¢ 10¢ 65¢

Fry—

Common Lipped:

No. 1 2 3 4 5

Per doz. \$0.75 .85 .95 1.15

Roasting and Baking—

Regal, S. S. & Co., 4 doz. Nos. 5, \$4.50;

10 \$5.00; 20 \$5.50; 30 \$6.00

Simplex, 4 gro. No. 40 \$30.00; 50,

\$34.50; 60 \$39.00; 140, \$33.00; 150,

\$37.50; 160, \$43.00.

Paper—**Building Paper—**

Per roll

Rosin Sized Sheathing: 500 sq. ft.

Light wt., 20 sq. ft. to lb. \$0.40 to .45

Medium wt., 18 sq. ft. to lb.

Heavy wt., extra quality, \$0.95 to 1.05

Medium Grades Water Proof

Sheathing \$0.80 to 1.25

Deafening Felt, 9, 6 and 1 1/2 sq. ft.

to lb., ton \$10.00

York Haven Waterproof Sheathing \$1.35 to 1.75

Tarred Paper.

1 ply (roll 90 sq. ft.), ton \$3.00

2 ply, roll 100 sq. ft. 55¢

3 ply, roll 100 sq. ft. 80¢

Sand and Emery—

List Dec. 23, 1899, 50¢ 10¢ 50¢ 10¢ 10¢

See Trade Report.

Parers—**Apple—**

Advance doz. \$4.50

Baldwin doz. \$5.00

Bonanza each \$5.00

Dandy each \$7.50

Eureka, 1898 each \$16.00

Family Bay State doz. \$12.00

Hudson's Little Star doz. \$4.00

Hudson's Rocking Table doz. \$5.50

Improved Bay State doz. \$27.00 to \$30.00

New Lightning doz. \$5.50

Reading 72 doz. \$4.00

Reading 78 doz. \$7.00

Turn Table 98 doz. \$5.50

White Mountain doz. \$4.00

Potato—

Saratoga doz. \$5.50

White Mountain doz. \$4.50

Picks and Mattocks—

List Feb. 23, 1899, 75¢ 75¢ 10¢

Pinking Irons—

See Irons, Pinking.

Pins—**Escutcheon—**

Brass 60¢ 10¢

Iron, list Nov. 11, '85, 60¢ 10¢

Pipe, Cast Iron Soil—

Factory Shipments.

Standard, 2-6 in. 70¢ to 70¢ 5¢

Extra Heavy, 2-6 in. 75¢ to 75¢ 5¢

Washers—	
Leather, Axle—	
Solid.....	80¢ 10¢ 10¢ 85¢
Patent.....	85¢ 10¢ 10¢ 85¢
Coil: 1/4 1 1 1/4 1 1/4	11¢ 11¢ 13¢ 15¢ per 100
Iron or Steel—	
Size bolt....	5-18 1/4 1/4 1/4 1/4
Washers.....	\$5.60 4.70 3.10 3.20 3.00
In lots less than one keg add 1/4¢ per lb., 5-lb. boxes add 1/4¢ to list.	
Cast Washers—	
Over 1/2 inch, barrel lots, per lb.....	1 1/4¢ @ 13¢
Washer Cutters—	
See Cutters, Washer.	
Washing Machines—	
See Machines, Washing.	
Water Coolers—	
See Coolers, Water.	
Weaners—	
Tyler's New Halter—No. 1 # doz. \$3.45;	
No. 2, \$3.70; No. 3, \$4.00; No. 4, \$4.30;	
Tyler's Saver—Nos. 1 and 2, # doz. \$1.70;	
No. 3, \$2.00; No. 4, \$2.30.	
Wedges—	
Oil Finish.....	lb. 3/4¢

Weights, Sash—	
Eastern prices.....	\$25.00
Western prices.....	\$13.00 @ 19.00
NOTE.—There is a wide difference in prices East and West, and some Foundries are naming lower prices than the above.	
Well Buckets, Galvanized	
See Pails, Galvanized.	
Wheels Well—	
8-in., \$1.65 @ 1.75; 10-in., \$2.00 @ 2.10;	
12-in., \$2.50 @ 2.75; 14-in., \$3.25 @ 3.40	
Wire and Wire Goods—	
Brt. and Ann., 6 to 9.....	70¢ @ 10%
Brt. and Ann., 10 to 18.....	72 1/2¢ @ 5%
Brt. and Ann., 19 to 26.....	75¢ @ 7 1/2%
Brt. and Ann., 27 to 36.....	75¢ @ 10¢ 2 1/2%
Cop'd and Galv., 6 to 9.....	60 3/4¢ @ 5%
Cop'd and Galv., 10 to 18.....	70%
Cop'd and Galv., 19 to 26.....	70¢ @ 10%
Cop'd and Galv., 27 to 36.....	72 1/2¢ @ 5%
Tinned, 6 to 14.....	70¢ @ 10¢ 5%
Tinned, 15 to 18.....	70¢ @ 5%
Tinned, 19 to 26.....	70%
Tinned, 27 to 36.....	75¢ @ 10%
Annealed Wire on Spools.....	70¢ @ 5¢ @ 70
Brass and Copper Wire on Spools.....	
60¢ @ 5¢ @ 10%	
Brass, list Feb. 26, '96.....	
.....	

Copper, list Feb. 26, '96.....	15%
Cast Steel Wire.....	50%
Stub's Steel Wire.....	\$5.00 to \$2.40%
Wire Clothes Line, see Lines.	
Wire Picture Cord, see Cord.	
Bright Wire Goods—	
Iron and Brass, list July 1, 1899.....	85¢ @ 35¢ 10%
Wire Cloth and Netting—	
Galvanized Wire Netting.....	30¢ @ 30¢ 35%
Painted Screen Cloth per 100 ft.....	\$1.00 @ \$1.05
Light Hardware Grade:	
1-3 Mesh, Plain (8c. list) sq. ft.....	14¢
1-3 Mesh, Galv. (8c. list) sq. ft.....	24¢
Wire Barb—See Trade Report.	
Wire, Rope—See Rope, Wire.	
Wrenches—	
Agricultural.....	70¢ @ 10¢ 75%
Case lots.....	75¢ @ 10%
Baxter's S.....	60¢ @ 10%
Coe's Genuine.....	40¢ @ 10¢ 55%
Coe's Mechanics.....	40¢ @ 10¢ 55%
Aerne.....	60¢ @ 10%
Alligator.....	60¢ @ 10%

Bemis & Call's:	
Adjustable S.....	35¢ @ 5%
Adjustable S Pipe.....	40%
Brigg's Pattern.....	30¢ @ 10%
Combination Black.....	40¢ @ 5%
Combination Bright.....	40%
Cylinder or Gas Pipe.....	55%
Extra Heavy.....	45%
Merrick's Pattern.....	50%
No. 3 Pipe, Bright.....	55%
Bindley Automatic.....	80%
Boardman's.....	33 1/4%
Bull Dog, W. & B.....	60¢ @ 10¢ 10%
Donohue's Engineer.....	40¢ @ 10%
Eagle.....	50¢ @ 10%
Gem Pocket.....	80%
Hercules.....	70%
Solid Handles, F. & W.....	50¢ @ 10%
Stevenson.....	60¢ @ 10¢ 10%
Wrought Goods—	
Staples, Hooks, etc., list March 17	
'92.....	85¢ @ 10¢ 85¢ 15%
Yokes, Neck—	
Covert Saddlery Works, Trimme.....	1.60 @ 5%
Covert Saddlery Works, Neck Yoke	
Centers.....	70%
Yokes, Ox, and Ox Bows—	
Fort Madison's Farmers & Freighters..	list not
Zinc—	
Sheet.....	lb 6 1/4¢ @ 7¢

PAINTS, OILS AND COLORS.—Wholesale Prices.

White Lead, Zinc, &c.	
Lead, Foreign white, in Oil.....	7 1/4¢ @ 9 1/4%
Lead, American White, in Oil:	
Lots of 500 lb or over.....	@ 6 1/4%
Lots less than 500 lb.....	@ 7
Lead, White, in Oil, 25 lb tin	
pails, add to keg price.....	@ 1/4
Lead, White, in Oil, 12 1/2 lb tin	
pails, add to keg price.....	@ 1
Lead, White, in Oil, 1 to 5 lb as-	
sorted tins, add to keg price.....	@ 1 1/4
Lead, White, Dry in bbls.....	5 1/4¢ @ 6
Lead, American. Terms: On lots of 500	
lbs. and over, 60 days, or 2% for cash if	
paid in 15 days from date of invoice.	
Zinc, American, dry.....	\$ 4 3/4¢ @ 4 1/4%
Zinc, Paris, Red Seal, dry.....	@ 4 1/4%
Zinc, Paris, Green Seal, dry.....	@ 4 1/4%
Zinc, Antwerp, Red Seal, dry.....	@ 6 1/4%
Zinc, Antwerp, Green Seal, dry.....	@ 7 1/4%
Zinc, V. M. French, in Poppy Oil,	
Green Seal.....	@ 12 1/2%
Lots of 1 ton and over.....	@ 12 1/2%
Lots of less than 1 ton.....	@ 12 1/2%
Zinc, V. M. French, in Poppy Oil,	
Red Seal.....	@ 10 1/4%
Lots of 1 ton and over.....	@ 10 1/4%
Lots of less than 1 ton.....	@ 11 1/4%
DISCOUNTS.—V. M. French Zinc.—Dis-	
counts to buyers of 10 bbl. lots of one or	
assorted grades, 1%: 25 bbls., 2%: 50	
bbls., 4%.	
Dry Colors.	
Black, Carbon.....	\$ 8 @ 30
Black, Drop, Amer.....	2 1/4¢ @ 4
Black, Drop, Eng.....	7 @ 11
Black, Ivory.....	15 @ 21
Lamp, Cont.....	3 @ 5
Blue, Celestial.....	\$ 3 1/2¢ @ 8
Blue, Chinese.....	35 @ 40
Blue, Prussian.....	30 @ 33
Blue, Ultramarine.....	30 @ 35
Brown, Spanish.....	1 1/2¢ @ 1
Brown, Vandyke, Amer.....	13¢ @ 24
Brown, Vandyke, Foreign.....	2 1/2¢ @ 3 1/2
Carmine, No. 40.....	\$ 2 1/2¢ @ 2 1/2
Green, Chrome, ordinary.....	\$ 2 1/2¢ @ 2 1/2
Green, Chrome, pure.....	16 @ 23
Lead, ited, bbls. 1/2 bbls. and kegs:	
Lots 500 lb or over.....	@ 6 1/4%
Lots less than 500 lb.....	@ 6 1/4%
Litharge, bbls. 1/2 bbls. and kegs:	
Lots 500 lb or over.....	@ 6 1/4%
Lots less than 500 lb.....	@ 6 1/4%
Ocher, French Washed.....	1 1/4¢ @ 2 1/4
Ocher, Dutch Washed.....	4 1/4¢ @ 5
Ocher, American.....	\$ 10.00 @ 15.00
Orange Mineral, English.....	\$ 8 @ 11 1/4
Orange Mineral, French.....	11 1/4¢ @ 11 1/4
Orange Mineral, German.....	8 1/4¢ @ 9 1/4
Orange Mineral, American.....	8 @ 8 1/4
Red, Indian, English.....	4 1/4¢ @ 8 1/4
Red, Indian, American.....	3 @ 3 1/4
Red, Turkey, English.....	4 @ 6
Red, Tuscan, English.....	7 @ 10
Red, Venetian, Amer.....	\$ 100 lb. 80¢ @ 10
Red, Venetian, English.....	\$ 100 lb. 1.80 @ 2.10
Sienna, Italian, Burnt and	
Powdered.....	\$ 3 1/4¢ @ 9 1/4
Sienna, Ital., Raw, Powd.....	3 1/4¢ @ 7 1/4
Sienna, American, Raw.....	1 1/4¢ @ 2
Sienna, American, Burnt and	
Powdered.....	\$ 2 @ 1 1/4
Talc, French.....	\$ 100 lb. \$1.25 @ 1.50
Talc, American.....	.90 @ 1.10
Terra Alba, French.....	\$ 100 lb. .95 @ 1.00
Terra Alba, English.....	.85 @ 1.00
Terra Alba, American No. 1.....	.65 @ .85
Terra Alba, American No. 2.....	.45 @ .60
Umber, Turkey, Bnt. & Powd.....	2 1/4¢ @ 3 1/4
Umber, Turkey, Raw & Powd.....	2 1/4¢ @ 3 1/4
Umber, Bnt. Amer.....	1 1/4¢ @ 2
Umber, Raw, Amer.....	1 1/4¢ @ 2
Yellow, Chrome.....	10 1/2¢ @ 25
Vermilion, American Lead.....	10 @ 32 1/2
Vermilion, quicksilver, bulk.....	@ 72
Vermilion, quicksilver, bags.....	@ 73
Vermilion, English, Import.....	.80 @ 95
Vermilion, Chinese.....	.88 @ 95
Colors in Oil.	
Black, Lampblack.....	13 @ 14
Blue, Chinese.....	36 @ 40
Blue, Prussian.....	32 @ 39
Blue, Ultramarine.....	13 @ 16
Brown, Vandyke.....	9 1/4¢ @ 13
Green, Chrome.....	10 @ 12
Lead, ited, bbls. 1/2 bbls. and kegs:	
Lots 500 lb or over.....	@ 6 1/4%
Lots less than 500 lb.....	@ 6 1/4%
Litharge, bbls. 1/2 bbls. and kegs:	
Lots 500 lb or over.....	@ 6 1/4%
Lots less than 500 lb.....	@ 6 1/4%
Ocher, French Washed.....	1 1/4¢ @ 2 1/4
Ocher, Dutch Washed.....	4 1/4¢ @ 5
Ocher, American.....	\$ 10.00 @ 15.00
Orange Mineral, English.....	\$ 8 @ 11 1/4
Orange Mineral, French.....	11 1/4¢ @ 11 1/4
Orange Mineral, German.....	8 1/4¢ @ 9 1/4
Orange Mineral, American.....	8 @ 8 1/4
Red, Indian, English.....	4 1/4¢ @ 8 1/4
Red, Indian, American.....	3 @ 3 1/4
Red, Turkey, English.....	4 @ 6
Red, Tuscan, English.....	7 @ 10
Red, Venetian, Amer.....	\$ 100 lb. 80¢ @ 10
Red, Venetian, English.....	\$ 100 lb. 1.80 @ 2.10
Sienna, Italian, Burnt and	
Powdered.....	\$ 3 1/4¢ @ 9 1/4
Sienna, Ital., Raw, Powd.....	3 1/4¢ @ 7 1/4
Sienna, American, Raw.....	1 1/4¢ @ 2
Sienna, American, Burnt and	
Powdered.....	\$ 2 @ 1 1/4
Talc, French.....	\$ 100 lb. \$1.25 @ 1.50
Talc, American.....	.90 @ 1.10
Terra Alba, French.....	\$ 100 lb. .95 @ 1.00
Terra Alba, English.....	.85 @ 1.00
Terra Alba, American No. 1.....	.65 @ .85
Terra Alba, American No. 2.....	.45 @ .60
Umber, Turkey, Bnt. & Powd.....	2 1/4¢ @ 3 1/4
Umber, Turkey, Raw & Powd.....	2 1/4¢ @ 3 1/4
Umber, Bnt. Amer.....	1 1/4¢ @ 2
Umber, Raw, Amer.....	1 1/4¢ @ 2
Yellow, Chrome.....	10 1/2¢ @ 25
Vermilion, American Lead.....	10 @ 32 1/2
Vermilion, quicksilver, bulk.....	@ 72
Vermilion, quicksilver, bags.....	@ 73
Vermilion, English, Import.....	.80 @ 95
Vermilion, Chinese.....	.88 @ 95
Colors in Oil.	
Black, Lampblack.....	13 @ 14
Blue, Chinese.....	36 @ 40
Blue, Prussian.....	32 @ 39
Blue, Ultramarine.....	13 @ 16
Brown, Vandyke.....	9 1/4¢ @ 13
Green, Chrome.....	10 @ 12
Lead, ited, bbls. 1/2 bbls. and kegs:	
Lots 500 lb or over.....	@ 6 1/4%
Lots less than 500 lb.....	@ 6 1/4%
Litharge, bbls. 1/2 bbls. and kegs:	
Lots 500 lb or over.....	@ 6 1/4%
Lots less than 500 lb.....	@ 6 1/4%
Ocher, French Washed.....	1 1/4¢ @ 2 1/4
Ocher, Dutch Washed.....	4 1/4¢ @ 5
Ocher, American.....	\$ 10.00 @ 15.00
Orange Mineral, English.....	\$ 8 @ 11 1/4
Orange Mineral, French.....	11 1/4¢ @ 11 1/4
Orange Mineral, German.....	8 1/4¢ @ 9 1/4
Orange Mineral, American.....	8 @ 8 1/4
Red, Indian, English.....	4 1/4¢ @ 8 1/4
Red, Indian, American.....	3 @ 3 1/4
Red, Turkey, English.....	4 @ 6
Red, Tuscan, English.....	7 @ 10
Red, Venetian, Amer.....	\$ 100 lb. 80¢ @ 10
Red, Venetian, English.....	\$ 100 lb. 1.80 @ 2.10
Sienna, Italian, Burnt and	
Powdered.....	\$ 3 1/4¢ @ 9 1/4
Sienna, Ital., Raw, Powd.....	3 1/4¢ @ 7 1/4
Sienna, American, Raw.....	1 1/4¢ @ 2
Sienna, American, Burnt and	
Powdered.....	\$ 2 @ 1 1/4
Talc, French.....	\$ 100 lb. \$1.25 @ 1.50
Talc, American.....	.90 @ 1.10
Terra Alba, French.....	\$ 100 lb. .95 @ 1.00
Terra Alba, English.....	.85 @ 1.00
Terra Alba, American No. 1.....	.65 @ .85
Terra Alba, American No. 2.....	.45 @ .60
Umber, Turkey, Bnt. & Powd.....	2 1/4¢ @ 3 1/4
Umber, Turkey, Raw & Powd.....	2 1/4¢ @ 3 1/4
Umber, Bnt. Amer.....	1 1/4¢ @ 2
Umber, Raw, Amer.....	1 1/4¢ @ 2
Yellow, Chrome.....	10 1/2¢ @ 25
Vermilion, American Lead.....	10 @ 32 1/2
Vermilion, quicksilver, bulk.....	@ 72
Vermilion, quicksilver, bags.....	@ 73
Vermilion, English, Import.....	.80 @ 95
Vermilion, Chinese.....	.88 @ 95
Colors in Oil.	
Black, Lampblack.....	13 @ 14
Blue, Chinese.....	36 @ 40
Blue, Prussian.....	32 @ 39
Blue, Ultramarine.....	13 @ 16
Brown, Vandyke.....	9 1/4¢ @ 13
Green, Chrome.....	10 @ 12
Lead, ited, bbls. 1/2 bbls. and kegs:	
Lots 500 lb or over.....	@ 6 1/4%
Lots less than 500 lb.....	@ 6 1/4%
Litharge, bbls. 1/2 bbls. and kegs:	
Lots 500 lb or over.....	@ 6 1/4%
Lots less than 500 lb.....	@ 6 1/4%
Ocher, French Washed.....	1 1/4¢ @ 2 1/4
Ocher, Dutch Washed.....	4 1/4¢ @ 5
Ocher, American.....	\$ 10.00 @ 15.00
Orange Mineral, English.....	\$ 8 @ 11 1/4
Orange Mineral, French.....	11 1/4¢ @ 11 1/4
Orange Mineral, German.....	8 1/4¢ @ 9 1/4
Orange Mineral, American.....	8 @ 8 1/4
Red, Indian, English.....	4 1/4¢ @ 8 1/4
Red, Indian, American.....	3 @ 3 1/4
Red, Turkey, English.....	4 @ 6
Red, Tuscan, English.....	7 @ 10
Red, Venetian, Amer.....	\$ 100 lb. 80¢ @ 10
Red, Venetian, English.....	\$ 100 lb. 1.80 @ 2.10
Sienna, Italian, Burnt and	
Powdered.....	\$ 3 1/4¢ @ 9 1/4
Sienna, Ital., Raw, Powd.....	3 1/4¢ @ 7 1/4
Sienna, American, Raw.....	1 1/4¢ @ 2
Sienna, American, Burnt and	
Powdered.....	\$ 2 @ 1 1/4
Talc, French.....	\$ 100 lb. \$1.25 @ 1.50
Talc, American.....	.90 @ 1.10
Terra Alba, French.....	\$ 100 lb. .95 @ 1.00
Terra Alba, English.....	.85 @ 1.00
Terra Alba, American No. 1.....	.65 @ .85
Terra Alba, American No. 2.....	.45 @ .60
Umber, Turkey, Bnt. & Powd.....	2 1/4¢ @ 3 1/4
Umber, Turkey, Raw & Powd.....	2 1/4¢ @ 3 1/4
Umber, Bnt. Amer.....	1 1/4¢ @ 2
Umber, Raw, Amer.....	1 1/4¢ @ 2
Yellow, Chrome.....	10 1/2¢ @ 25
Vermilion, American Lead.....	10 @ 32 1/2
Vermilion, quicksilver, bulk.....	@ 72
Vermilion, quicksilver, bags.....	@ 73
Vermilion, English, Import.....	.80 @ 95
Vermilion, Chinese.....	.88 @ 95
Colors in Oil.	
Black, Lampblack.....	13 @ 14
Blue, Chinese.....	36 @ 40
Blue, Prussian.....	32 @ 39
Blue, Ultramarine.....	13 @ 16
Brown, Vandyke.....	9 1/4¢ @ 13
Green, Chrome.....	10 @ 12
Lead, ited, bbls. 1/2 bbls. and kegs:	
Lots 500 lb or over.....	@ 6 1/4%
Lots less than 500 lb.....	@ 6 1/4%
Litharge, bbls. 1/2 bbls. and kegs:	
Lots 500 lb or over.....	@ 6 1/4%
Lots less than 500 lb.....	@ 6 1/4%
Ocher, French Washed.....	1 1/4¢ @ 2 1/4
Ocher, Dutch Washed.....	4 1/4¢ @ 5
Ocher, American.....	\$ 10.00 @ 15.00
Orange Mineral, English.....	\$ 8 @ 11 1/4
Orange Mineral, French.....	11 1/4¢ @ 11 1/4
Orange Mineral, German.....	8 1/4¢ @ 9 1/4
Orange Mineral, American.....	8 @ 8 1/4
Red, Indian, English.....	4 1/4¢ @ 8 1/4
Red, Indian, American.....	3 @ 3 1/4
Red, Turkey, English.....	4 @ 6
Red, Tuscan, English.....	7 @ 10
Red, Venetian, Amer.....	\$ 100 lb. 80¢ @ 10
Red, Venetian, English.....	\$ 100 lb. 1.80 @ 2.10
Sienna, Italian, Burnt and	
Powdered.....	\$ 3 1/4¢ @ 9 1/4
Sienna, Ital., Raw, Powd.....	3 1/4¢ @ 7 1/4
Sienna, American, Raw.....	1 1/4¢ @ 2
Sienna, American, Burnt and	
Powdered.....	\$ 2 @ 1 1/4
Talc, French.....	\$ 100 lb. \$1.25 @ 1.50
Talc, American.....	.90 @ 1.10
Terra Alba, French.....	\$ 100 lb. .95 @ 1.00
Terra Alba, English.....	.85 @ 1.00
Terra Alba, American No. 1.....	.65 @ .85
Terra Alba, American No. 2.....	.45 @ .60</

CURRENT METAL PRICES.

DECEMBER 26, 1900.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from Store—

Common Iron: Duty, Round, 0.6¢ per lb.; Square, 0.8¢ per lb.	
1 to 1 1/4 in. round and square	1.70 to 1.80¢
1 1/4 to 4 in. x 3/8 to 1 in.	1.70 to 1.80¢
Refined Iron:	
1 to 1 1/4 in. round and square	1.75 to 1.85¢
1 1/4 to 4 in. x 3/8 to 1 in.	1.90 to 2.00¢
Rods—3/4 and 1-1/2 round and square	2.10 to 2.20¢
Angles:	
3 in. x 1/2 in. and larger	2.00¢
3 to 3 1/2 in. x 3/8 in.	2.00¢
1 1/2 to 3 in. x 1/2 in.	2.10¢
1 1/2 to 2 1/2 in. x 3/8 in. and thicker	2.00¢
1 to 1 1/2 in. x 3/8 in.	2.10¢
1 to 1 1/4 in. x 1/2 in.	2.20¢
3/4 x 1/2 in.	2.50¢
3/4 x 1/2 in.	2.50¢
3/4 x 1/2 in.	3.20¢
3/4 x 3/8 in.	3.70¢
Teet:	
1 in.	2.50¢
1 1/4 in.	2.40¢
1 1/2 in. and larger	2.30¢
Beams:	
Channels, 3 in. and larger	2.25¢
Rails—1 1/2 to 6 x 3/8 to No. 8	2.15¢
"Burdens' Best" Iron, base price	3.15¢
Burdens' "H. B. & S. Iron, base price	2.05¢
"Water"	3.60¢
Norway Bars	4.40 to 4.50¢
Norway Shapes	4.40 to 4.50¢

Merchant Steel from Store—

Bessemer Machinery	1.80 to 1.90¢
Toe Calk, Tire and Sleigh Shoe	2.00 to 2.50¢
Best Cast Steel, base price in small lots	7.50¢
Best Cast Steel Machinery, base price in small lots	6¢

Soft Steel Sheets—

3/4 inch	2¢	No. 14	2.50¢
3/8 inch	2.05¢	No. 16	2.60¢
No. 8	2.20¢	No. 18	2.90¢
No. 10	2.30¢	No. 20	3.30¢
No. 12	2.40¢	No. 22	3.40¢

Sheet Iron from Store, Black.

	One Pass, C. R.	R. G. Cleaned.
Nos. 14 to 16	3.05¢	3.10¢
Nos. 18 to 21	3.15¢	3.20¢
Nos. 22 to 24	3.25¢	3.30¢
No. 25 and 26	3.40¢	3.45¢
No. 27	3.45¢	3.50¢
No. 28	3.55¢	3.60¢

Russia, Planished, &c.

Genuine Russia, according to assortment	10¢
Patent Planished	10¢
Galvanized	10¢

Nos. 10 to 16	12¢
Nos. 17 to 21	13¢
Nos. 22 to 24	14¢
Nos. 25 to 26	15¢
No. 27	16¢
No. 28	17¢
No. 29	18¢
No. 30	21¢
30 in. 1¢ higher	

Foreign Steel from Store—

Best Cast	15¢
Extra Cast	18¢
Swaged, Cast	16¢
Best Double Shear	15¢
Blister, 1st quality	13¢
German Steel, Best	10¢
2d quality	9¢
3d quality	8¢
Sheet Cast Steel, 1st quality	15¢
2d quality	14¢
3d quality	12¢
R. Muesel's "Special"	46¢
" " Annealed	75¢
" " "Titanic"	19¢
Hobson's Choice XX Extra Best	35¢
Jensop Self Hardening	45¢
Beamans' "Nelson" Steel	40¢
Hobson's "Soho" Special Self Hardening	43¢

METALS—

Tin—

Duty—Pigs, Bars and Block. Free.	
Banca, Pigs	27¢
Straits, Pigs	26¢
Straits in Bars	27¢

Tin Plates—

American Charcoal Plates.

Calland grade:	
IX, 14 x 20	\$6.75
IX, 14 x 20	8.25
Meyn grade:	
IX, 14 x 20	6.25
IX, 14 x 20	7.75
Altway grade:	
IX, 14 x 20	5.50
IX, 14 x 20	6.60

American Coke Plates—Bessemer—

IX, 14 x 20	108¢
IX, 14 x 20	\$4.85 to \$4.90
IX, 14 x 20	\$5.05 to \$5.10
IX, 14 x 20	\$7.20 to \$7.25

American Terne Plates—

IX, 20 x 28	\$0.50 to \$0.60
IX, 20 x 28	\$1.25 to \$1.30

Tin Boiler Plates, American—

IX, 14 x 20	112 sheets	\$12.50
IX, 14 x 20	112 sheets	13.50
IX, 14 x 31	112 sheets	15.00

Copper—

Duty: Pig, Bar and Ingot and Old Copper free	
Manufactured, 2¢ per lb.	
Ingot—	
Lake	17¢
Amsonia grade Casting	17¢

Sheet and Bolt—

January 19, 1900.

Net.

Prices, in cents per pound.

Sheet 20 x 60.

Not wider than		Not longer than		And longer than		84 oz. & over, 50 lb. sheet, 30 x 60 and heavier.		30 oz. to 64 oz., 25 to 50 lb.		84 oz., to 30 oz., 18½ to 25 lb.		16 oz. to 24 oz., 22½ to 16½ lb.		14 oz. and 15 oz., 11 to 12½ lb.		12 oz. and 13 oz., 9½ to 11 lb.		10 oz. and 11 oz., 7½ to 9½ lb.		8 oz. and 9 oz., 6¼ to 7¼ lb.		Lighter than 8 oz.			
Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.	
30	72	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	90	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	108	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	126	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	144	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	162	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	180	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	198	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	216	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	234	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	252	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	270	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	288	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	306	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	324	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	342	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	360	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	378	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	396	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	414	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	432	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	450	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	468	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	486	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	504	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	522	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	540	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	558	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	576	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	594	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	612	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	630	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	648	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	666	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	684	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	702	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	720	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	738	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	756	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	774	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	792	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	810	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	828	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	846	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	864	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	882	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	900	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	918	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	936	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	954	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	972	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	990	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	1008	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	1026	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	1044	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	1062	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	1080	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	1098	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	1116	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	1134	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	1152	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	1170	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	1188	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20
30	1206	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	



CARY'S UNIVERSAL BOX STRAPPING.

CARY MFG. CO., 19 & 21 Roosevelt St., New York.

If you want highest market prices for your

OLD METALS AND OLD RUBBER

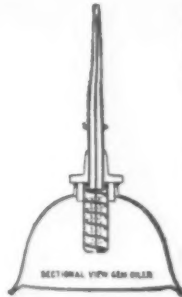
write for prices to

THEODORE HOFELLER & CO., 98-100-102 TERRACE, BUFFALO, N.Y.

Our motto in buying: PROMPT REMITTANCES.



The Gem Oiler
costs
as little as
the worse oilers
but are
the best oilers
made.



GEM MANUFACTURING CO.,

200, 202 Wood St.,
Pittsburg, Pa.

The Standard Hardware Lists For Pocket, Desk and Price Book Use ELEVENTH EDITION.

Revised to Date of Purchase. Enlarged to 129 Pages. Containing Over 300 Lists.

These lists are printed on thin paper of good quality and on only one side of each page, so that they may be cut out and inserted in price books.

The Standard Hardware Lists is an indexed book equally convenient for purposes of reference.

BOUND IN FLEXIBLE CLOTH COVER. PRICE, ONE DOLLAR, POSTPAID.

DAVID WILLIAMS COMPANY, Publishers, 232-238 William St., N. Y.

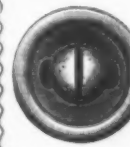
COVERT'S



FARMER, N. Y., U. S. A.

No. 300,
VICTOR
WAGON JACK.

Ives Patent Window Stop Adjuster



and 30-page
Catalogue of
Window Hardware
Specialties
mailed free.

H. B. Ives & Co.
New Haven, Conn.



PRIEST'S CLIPPERS



Largest Variety,
Toilet, Hand, Electric Power
ARE THE BEST.
Highest Quality Grooming and
Sheep-Shearing Machines.
WE MAKE THEM.

SEND FOR CATALOGUE TO
American Shearer Mfg. Co., Nashua, N.H., U.S.A.



The Williams
Printing Co.,
Commercial Printers,
and Binders.

Estimates Furnished for all Classes of Work.

232-238 William St., - New York.



SOLD
ALL OVER
THE WORLD.

NICHOLSON
NICHOLSON

FAMOUS
for
TEMPER and CUT.

**F
I
L
E
S**

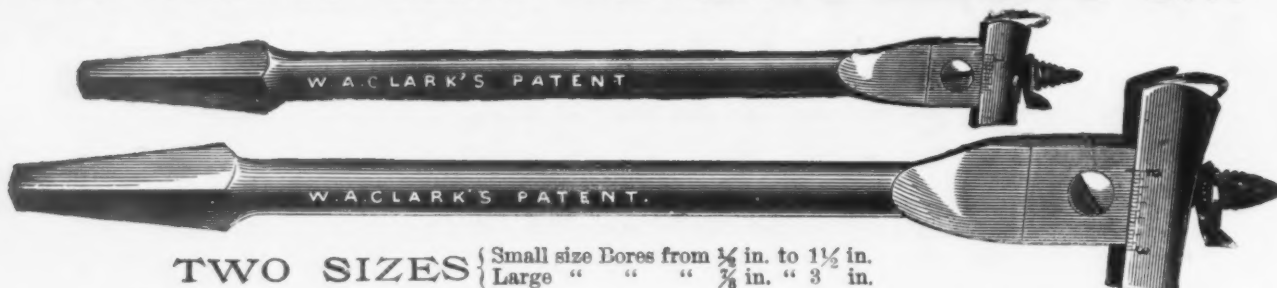
**R
A
S
P
S**

NICHOLSON
FILE CO.



PROVIDENCE,
R. I., U. S. A.

THE WM. A. CLARK PATENT EXPANSIVE BIT.



TWO SIZES { Small size Bores from $\frac{1}{4}$ in. to $1\frac{1}{2}$ in.
Large " " " $\frac{3}{8}$ in. " 3 in.

SPECIAL CUTTERS: No. 5—For Large Bit, Bores from 3 in. to 4 in. No. 6—For Large Bit, Bores from 4 in. to 5 in.

Stock and workmanship superior to all others. Every part interchangeable.

Quality guaranteed. For sale by all Hardware Dealers.

Manufactured by **R. H. BROWN & CO.,** New Haven, Conn.

*You take no risk on the quality
We make only the best!*



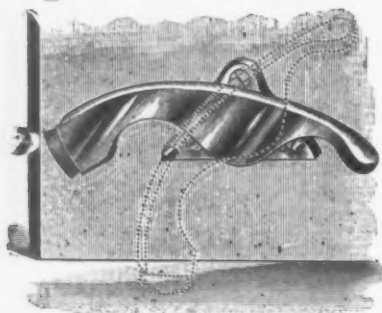
SAND PAPERS { Flint Paper
Carnet Paper
Emery Paper
Emery Cloth

HAIR FELTING for covering Boilers, Steam and Water Pipe, and lining Refrigerators.

BAEDER, ADAMSON & CO.

730 MARKET STREET, PHILADELPHIA.
67 BEEKMAN STREET, NEW YORK.
143 MILK STREET, BOSTON.
162 LAKE STREET, CHICAGO.

Empire Door Holder.

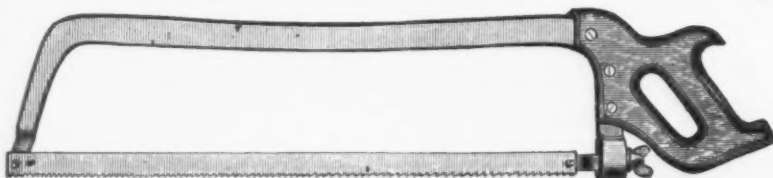


Operated by a light pressure of the toe. No bending over. The Rubber Tip and Spring Action make it particularly desirable for use on carpet, polished wood or tiled floor.

MANUFACTURED BY

CALDWELL MFG. CO.,
ROCHESTER, N. Y., U. S. A.

★ STAR BUTCHER SAW. ★



Don't Waste Your Time or Money

In having Butcher Saw Blades refiled when you can buy a new Star Blade for less than the cost of one filing. Star Blades are not intended to be refiled; they are made hard enough to do three or four times as much work before becoming dull as the ordinary blade is capable of doing under same conditions.

Supposing you have paid for forty filings in doing the amount of work that one dozen Star Blades will accomplish, then how much are you out? Consider also the convenience of always having sharp saws at hand.

Star Frames will please you both in quality and style. To try these goods once means to continue using them. They are now kept in stock by most of the prominent dealers throughout the country. Ask for them.

PRICE OF BLADES.

\$1.08 14	\$1.08 16	\$1.20 18	\$1.20 20	\$1.32 22	\$1.32 24	\$1.44 per dozen 26 inch
--------------	--------------	--------------	--------------	--------------	--------------	-----------------------------

PRICE OF FRAMES (Without Blades).

90c. 14	\$1.00 16	\$1.10 18	\$1.20 20	\$1.30 22	\$1.40 24	\$1.50 each 26 inch
------------	--------------	--------------	--------------	--------------	--------------	------------------------

MILLERS FALLS CO.,

28 Warren Street,

New York City.

FOR THE HOLIDAYS. TOY FREEZERS.

"CROWN" Christmas Tree Holders.

For Circulars and Prices, write
NORTH BROS. MFG. CO.,
PHILADELPHIA, PA.

Or New York Agents,
JOHN H. GRAHAM & CO.,
113 Chambers St.



MONCE'S NOVELTY GLASS CUTTERS. INTERCHANGEABLE LOCK STENCILS.

No. 1 Cutter, born 1871, and has been worthy of extensive imitation, that is why I keep it before you.
We make others S. G. MONCE, UNIONVILLE, CONN.

DISSTON'S SKEWBACK HAND SAWS.



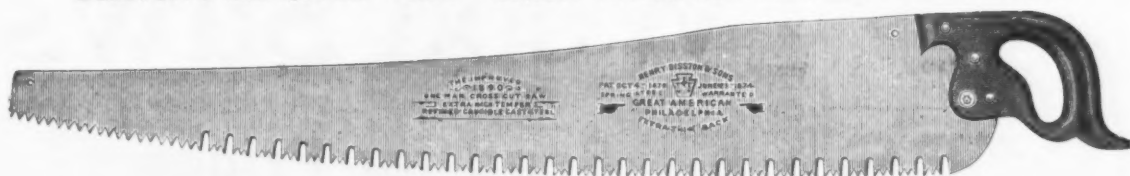
The Design and Construction Throughout was
Originated and Patented

BY THE LATE
HENRY DISSTON

JUNE 23d, 1874, and DEC. 8th, 1874.

All Saws Made After This Pattern **ARE COPIES**
of the Invention of *HENRY DISSTON*.

DISSTON'S IMPROVED "1890" GREAT AMERICAN ONE MAN SKEWBACK.



DISSTON SAWS

— ARE —

Imitated But Not Duplicated,

Either in Material, Workmanship or Finish.

HENRY DISSTON & SONS,

Keystone Saw, Tool, Steel and File Works,

PHILADELPHIA. PENNA.

OUR SILVER STEEL

DAMASKEENED

RIP SAW

Is all quality. This is true of all **ATKINS** saws, that's why they stand at the head. We make every known variety of saw for every purpose.

AWARDED TWO GOLD MEDALS
PARIS EXPOSITION, 1900.

Write for Catalogue.



E. C. ATKINS & CO., Incorp.,
Indianapolis, Ind.

BRANCHES: Memphis, Tenn.; Minneapolis, Minn.; Atlanta, Ga.; Portland, Oregon.

THE GRAND PRIX

ESTABLISHED 1832.

And A Special Gold Medal

PARIS 1900.

THE SIMONDS SAWS

(All Kinds)



PARIS 1900.

The only American Saw Manufacturers to have ever secured the Grand Prix at a Paris Exposition.

SIMONDS MANUFACTURING CO.,

Fitchburg, Mass.

New York, N. Y.

Chicago, Ill.

New Orleans, La.

San Francisco, Cal.

Portland, Ore.

Seattle, Wash.

Clark Expansive

AND
**WRIGHT'S
Jennings
BITS**



Warranted.
Conn. Valley Mfg. Co.,
CENTERBROOK, CONN., U. S. A.

AUGERS

Ship Nut Machine All kinds Made to
Augers Augers Augers Augers Order.

SNELL MFG. CO.,
Fiskdale, Mass., U. S. A.

PETER GERLACH & CO.,

CLEVELAND, O.,

Ice Tools**Logging Tools,****Keg Machinery.****Wood Saws****Send for Prices.**

THE NATIONAL SAW CO.

NEWARK, N. J.

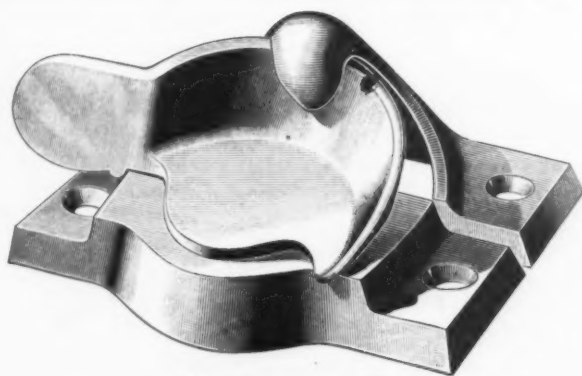
THE ART OF SELLING.

By F. B. GODDARD.

12mo. Flexible Cloth, 50 Cents.

In this book the author lets the reader into the secrets of the accomplished and successful salesman. Illustrates his tact and finesse, and tells how he masters men; but beyond this, the work embraces much information which will be instructive and useful to all classes of business men. Besides suggestions to buyers, it contains chapters on "Changes in Business Conditions and Methods," "Salesmen's Compensation," "Retail Merchants and Salesmen," "Saleswomen," "How to Read Character," with a collection of clearly and tersely put important Legal Principles and Decisions Governing Sales. Sent, post-paid, upon receipt of price, by

DAVID WILLIAMS CO., Publishers and Booksellers, 232 William St., New York.



Patented June 12, 1900

LATEST IMPROVED
"READING"
Sash Fastener,
 STRONG, SIMPLE, SECURE.

Draws both sashes tightly together so they cannot sag or rattle.

Cannot be forced open from outside.

Can be furnished in Plain or Ornamented

Bronze Metal, Bronze Plated or Bronzed Iron—All Finishes.

NEW YORK, 96 & 98 Reade St.
 PHILADELPHIA, 617 Market St.
 CHICAGO, 105 Lake St.

Reading Hardware Co.
 Reading, Pa.

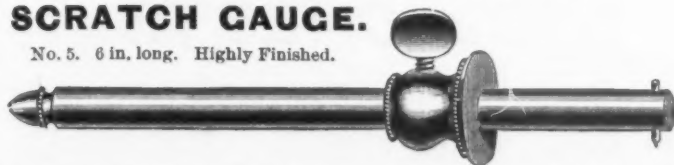
SCRATCH AWL.



Nickel Head. Finely Tempered Stubs. Steel Points.

SCRATCH GAUGE.

No. 5. 6 in. long. Highly Finished.



Manuf'd by THE SPRINGFIELD MACHINE SCREW CO., Springfield, Mass., U. S. A.

SEND FOR CIRCULARS OF FULL LINE.

CHICAGO: 36 LA SALLE ST.

A Lantern Not Needed

to see the good points of Warren's Patent Shelving. We are furnishing equipments for many of the leading hardware stores in the U. S. Let us send you our circulars fully describing our system of making an



OLD store NEW.

J. D. WARREN MFG. CO.,
 CHICAGO, U. S. A.

OFFICES DEPT. D,
 Rooms 502-503,
 MASONIC TEMPLE.

**GUARDIAN
 REGISTERS**

\$15 to \$50



New Booklet
 Sent Free

Showing the Register suitable for your business.

JOHN LOYD CO.,

Machine Knives, Shear Blades,
 Presses and Dies.

Nos. 558 to 562 Water Street, New York.

WOOD'S ICE TOOLS

**"ICE
 KING"**

Popular Prices.



The recognized standard in the United States and Canada for over 60 years.

Send for 1899 1900 Catalogue,
 WM T. WOOD & CO.,
 Arlington, - Mass., U. S. A.

NEW YORK AGENCY, Sickles & Nutting Co., 25 Barclay St



Sample, by mail, 25 cents.

GEM NAIL CLIPPER

Cuts, Cleans and Files.

It is a neat, well made, nickel plated article. Put up attractively and sold cheaply. Send for circulars and prices.

The H. C. Cook Co., Ansonia, Conn., U. S. A.

Write
for
Circulars.

To Cut Grass from 6 to 10 inches
high. 25-inch Knives.

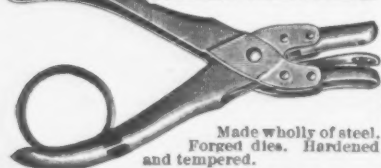
This Mower can be used with a pony and a boy to guide the mower, or one man to pull and a boy to guide. Double train of gears, large reel with patent cylinder knives, rear cut train of gears on both sides, Enos patent bed knife, patent draft irons, shifting clutch, weight 110 pounds.

Supplee Hardware Co.,
PHILADELPHIA.

The PONY or Two-Man Mower.



Standard Ticket Punch.



Made wholly of steel.
Forged dies. Hardened
and tempered.

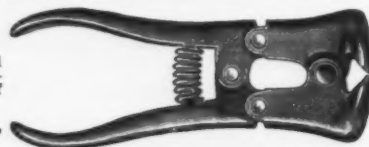
Bridgeport Putty Knife.



Cast steel, tempered blade, cherry finished handle. The Capped Brass Ferrule overlapping the blade at shank makes an even semi-circular bearing at that point, giving just the right amount of elasticity to the entire blade.

BRIDGEPORT MFG. CO., Bridgeport, Conn., U. S. A.,
Hardware Manufacturers.

Hercules Cutting Nippers. Forged from fine quality cast sheet steel, carefully tempered and tested. Will not cut piano wire.



NICOL & CO.,
Manufacturers of
Special and Light
HARDWARE,

57 W. Washington St.,
Chicago, Ills., U. S. A.

**THE BEST
KEY-HOLE SAW HANDLE**

IS THE



NEVER SLIP.

W. C. LADD, Maker, Bristol, Conn.
WRITE FOR PRICES.

PLAIN AND RATCHET BIT BRACES.

The largest line made in U. S.



MASON & PARKER,
Winchendon, - - - Mass.

Also Makers of other
Hardware Specialties.

JOHN H. GRAHAM & Co., Agents, 113 Chambers St., N.Y.

BAR-KEEPER'S FRIEND

WRITE GEO. W. HOFFMAN,
297 E. Washington St., Indpls, Ind.
4 FREE SAMPLE.

**U.S. INFALLIBLE
METAL POLISH**

TOOL CHESTS.

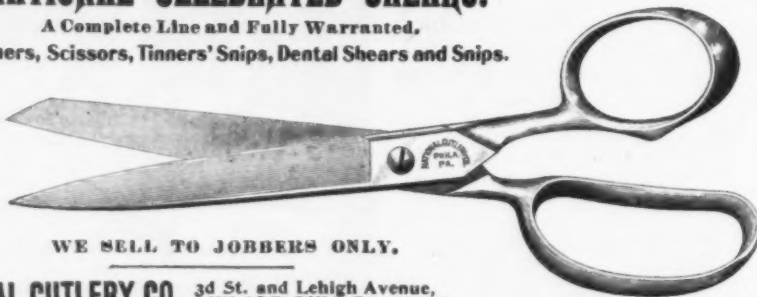
Boys', Gentlemen's, Carpenters', Machinists'
TOOL CHESTS, TOOL CHESTS, TOOL CHESTS.

We also manufacture **SPECIAL CHESTS**
to order.

C. E. JENNINGS & CO., 101 Reade St., New York.

THE NATIONAL CELEBRATED SHEARS.

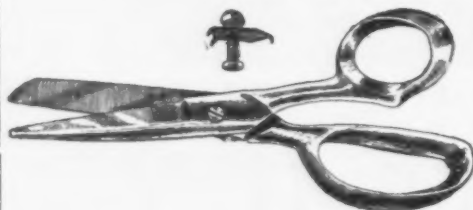
A Complete Line and Fully Warranted.
Trimmers, Scissors, Tanners' Snips, Dental Shears and Snips.



WE SELL TO JOBBERS ONLY.

NATIONAL CUTLERY CO., 3d St. and Lehigh Avenue,
PHILADELPHIA, PA., U.S.A.

NEW YORK OFFICE, - - 101 READE ST.



CELEBRATED LANG SHEARS

Patented Bolt and Tension Spring.
Manufacturers of full line of Bent and Straight
High Grade, Steel Laid Shears.
Send for Catalogue.

LANG CUTLERY WORKS,
Cedar Rapids, Ia.
New York Office, 102 CHAMBERS ST.

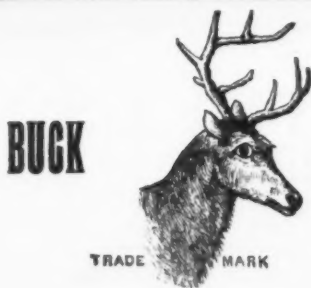
KNIVES.

Shoe, Butcher and Kitchen
Cutlery, Carpenters'
Drawing Knives, Screw
Drivers, etc.



C. J. KIMBALL COMPANY,
Bennington, N. H., U. S. A.

Send for Illustrated Catalogue of Full Line.



GENUINE
BROS. CHISELS | CARVING TOOLS
COUGES | PLANE IRONS &c.
 "STAMPED WITH THE BUCK'S HEAD."
 THE STANDARD FOR 40 YEARS
 Highest Awards & Prize Medals
 Sold by Hardware Dealers Everywhere
 Each tool bears one of the marks
 here shown. SEND FOR PRICE LIST.
 EDGE TOOL MFRS. MILLBURY, MASS.



BUCK'S HEAD.

HIGHEST AWARD PARIS EXPOSITION, 1889.



ESTABLISHED 1837.

INCORPORATED 1892.

THE L. & I. J. WHITE CO., MANUFACTURERS OF **EDGE TOOLS.**
 BUFFALO, N. Y., U. S. A. Coopers', Carpenters' and Ship Tools, Plane Irons,
 Cleavers, &c. Full Line Chisels.
 New York Office, 45 Centre St.

4 YEARS.

ESTABLISHED 1825.

75 YEARS.

CELEBRATED **HEINISCH** SHEARS
 ACKNOWLEDGED THE BEST.



Tailors' Shears, Trimmers, Scissors, Tinnors' Snips, etc.

R. HEINISCH'S SONS CO.,

New York Office, 90 Chambers Street.

NEWARK, N. J.

NOT CONNECTED WITH ANY SHEAR COMBINATION.

SOCKET FIRMER CHISELS
 BEVELED EDGES.



CHARLES BUCK TOOLS

have a world wide reputation.

SEND FOR CATALOGUE OF FULL LINE.

Screw Driver Bits, Reamers, Cupped Nail Sets, Gouges, etc., etc.

MILLBURY EDGE TOOL WORKS,

CHARLES BUCK, Proprietor.

MILLBURY, MASS., U. S. A.

FILING CABINETS A SPECIALTY.

The Brownfield Buyers' System especially adapted for filing
 catalogues, quotations and all data. Write for particulars.

THE FOLDING PAPER BOX CO., - - South Bend, Ind.

CATTARAUGUS POCKET KNIVES.

The value of a pocket knife is in the SATIS-
 FACTION that it gives you not only the first day
 but EVERY DAY that you have it.

We warrant all our KNIVES
 TO GIVE SATISFACTION
 ALL THE TIME. WE
 SELL ONLY to
 the RETAIL
 TRADE.

We solicit your
 patronage.



We make over 500 different
 patterns of Pocket
 Knives.

**CATTARAUGUS
 CUTLERY CO.**
 Little Valley,
 N. Y.

THE CELEBRATED RED SEAL SHEARS.

MANUFACTURED ONLY BY

THE ACME SHEAR CO.
 BRIDGEPORT, CONN.

The
**"ORIGINAL
 JENNINGS"**
**AUGERS and
 AUGER BITS.**



Genuine have
"Russell Jennings"

stamped in full
 on the Round of
 each Bit.

FOR SALE BY ALL HARDWARE JOBBERS.

The Russell Jennings Mfg. Co., Deep River, Ct., U. S. A.



ESTABLISHED 1774.

**HIGH
 GRADE AUGER BITS.**
 (BLACK TWIST.)

JOB T. PUCH, Philadelphia.

THE Ford Ship Augers.

SECOND TO NONE.

Prices Right.

THE FORD BIT CO.,
 HOLYOKE, MASS.

American Tool Chest Company,
 NEW YORK.
 MANUFACTURERS OF

TOOL CHESTS

Of all sizes, complete with tools, for Hardware, Toy
 Notion and Variety trades.

Factory and Salesroom,

200 West Houston Street, near Varick.

Also Machinists' Tool Chests, empty. Tool Cabinets
 and Work Benches. Illustrated Catalogue
 and prices furnished on application.

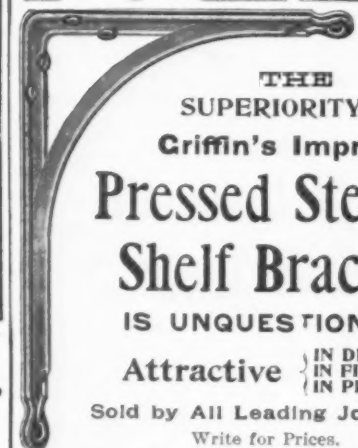
**GERMAN GIMLET
 DOUBLE CUT GIMLET
 SCREW DRIVER
 BELL HANGERS'**

BITS.

Send for Catalogue.

NORTON MFG. CO., Chester, Conn.

Agents: Allerton-Clarke Co., New York.



THE
 SUPERIORITY OF
 Griffin's Improved

**Pressed Steel
 Shelf Bracket**

IS UNQUESTIONED.

Attractive } IN DESIGN,
 } IN FINISH,
 } IN PRICE.

Sold by All Leading Jobbers.
 Write for Prices.

THE GRIFFIN MFG. CO., - Allegheny, Pa.

BICYCLE REPAIRING.

A Manual Compiled from Articles in
 "The Iron Age."

By **S. D. V. BURR.**

208 pages, 205 illustrations, cloth, price, \$1.00.

Sent, postpaid, on receipt of price by

David Williams Company,

232-236 William St.,

New York.



HOW ARE YOU ON SMALL KITCHEN STEELS?

GOODELL STEELS ARE GOOD STEELS.



Here's a proposition that means money for the dealer.

FULL OF LIFE—
FINEST TEMPER

Goodell No. 75

SPECIAL STEEL
RISING CUT

This is a small steel, 8 inch, with metal guard, birch handle with hanger, intended for Kitchen and other use where an inexpensive steel is required, but made from same special stock and with the same care and integrity as our best grade steels.

Best money maker ever handled.

ASK DRUMMERS TO SHOW YOU THE GOODELL No. 75 STEEL.

GOODELL COMPANY, - - - ANTRIM, N. H.
NEW YORK OFFICE, 10 WARREN STREET.

TRY

Mugford's Half Tones,
Wood Cuts and Electrotypes.

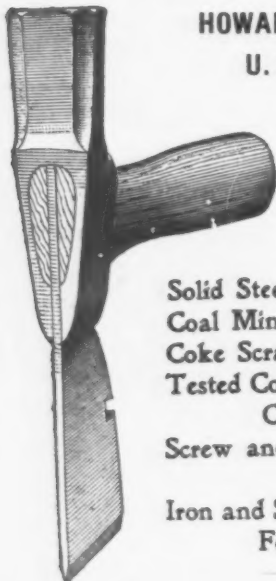
"You See Them Everywhere,"

A. MUGFORD,
ENGRAVER and ELECTROTYPYER.
HARTFORD, CONN.

New York Office, 130 Liberty Street.

...Jenkins...
Iron and Tool Co.,

HOWARD, PA.,
U. S. A.



Weldless
Steel
Rakes,

Solid Steel Hoes,
Coal Mining Picks,
Coke Scraper Heads,
Tested Coil and
Cable Chain,
Screw and Strap
Hinges,
Iron and Steel
Forgings, &c.

SURPLESS, DUNN & CO.,
65 Warren St., New York.

Cast Brass Butt Hinges

IN STOCK AND FOR SALE BY

W. & J. TIEBOUT,

No. 118 Chambers St., New York,

MANUFACTURERS OF
**BRASS, GALVANIZED & SHIP CHANDLERY
HARDWARE.**



Established 1882. Cable Address, "BLISS."

MANUFACTURERS OF
Wood Turnings, Hand,
Bench and other Screws,
Mallets, Handles, Vises,
Clamps, Tool Chests,
Croquet, Lithographs,
Wood Toys, Novelties,
and also the Celebrated
Wood's Patent Car Gate,
For Street and Steam
Railroad Cars.

The R. BLISS MFG. CO.,
PAWTUCKET, R.I., U.S.A.

"BROWN" COW TIES.



Our Cow Ties are unquestionably the most reliable and attractive stable fixtures that this or any other country can produce. Every part is made from best grade of steel and by patented **WELDLESS PROCESSES.**

THEY WILL PLEASE YOUR CUSTOMERS.

Manufactured only by

THE BRIDGEPORT CHAIN CO., Bridgeport, Conn.



MALLEABLE TINNED HANDLES and EARS.

Many kinds and sizes always in stock. Special kinds to order.

Send for Catalog.

BERGER BROS. CO., 231 and 237 Arch St., Philadelphia.

BOOKS.

YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing **DAVID WILLIAMS COMPANY,** Publishers and Booksellers, 232-238 William St., N. Y.

The Rogers & Hamilton Co. (International Silver Co., Successor),

Announce the completion of their new pattern

The MARQUISE.

(Design Patented.)



THE MARQUISE is made all staple and fancy pieces; send for complete list.

Factory K., INTERNATIONAL SILVER CO., formerly

New York, 9-11-13 Maiden Lane.

THE ROGERS & HAMILTON CO., Waterbury, Conn.

MAKE YOUR MARK ON IRON

with Metal Workers' Crayons and Soapstone Pencils made by

D. M. STEWARD MFG. CO.,

107 Chambers St., New York.

CHATTANOOGA, TENN., U. S. A.

D. M. STEWARD'S



WONDER ACETYLENE BURNERS.

Recognized the world over as the best Acetylene Burner ever made.

Photometer tests show highest candle power with smallest consumption of gas.

Made only by

STATE LINE TALC CO.,

Chattanooga, Tenn., U. S. A.

3/4, 1/2, 3/8 and 1 ft. sizes

THE ORIGINAL Baltzly Stove Truck,

From latest design and improved patterns. Three-foot platform. Total length 5 feet. Height of lowered platform 4 inches. Height of raised platform 7 1/2 inches. These Trucks are made entirely of iron and steel, are strong and durable and will carry a heavy load. Warranted first-class in all respects.Manufactured by....

ARCADE MFG. CO., FREEPORT, ILL.

Write us for Prices and Full Particulars.

SIMPLEX TIME RECORDERS SAVE MONEY—

Lang and Goodhue Mfg. Co., Engineers and Machinists, Burlington, Vt., say: "We have had your time recorder in our shops for the past two years. It has inculcated *punctuality* in our entire force. We consider it the best time recorder in existence."

Let us send you the book with the whole story. It's short and it may save you some money.

Simplex Time Recorder Co., Gardner, Mass., U. S. A.

Successors to Time Recorder Dept. of Heywood Bros. & Wakefield Co.

227 Wabash Avenue, Chicago, Ill.

N. E. Agents—Moore & Booth, 170 Summer St., Boston, Mass.

SNOW FLAKE

COACH OIL AXLE GREASE

Considered the Best Made.

Send for our price list and a few facts boiled down.

SNOW FLAKE AXLE GREASE CO.,
Sudbury St., Boston, Mass., U. S. A.

T. W. GILBERT & CO., Phila., Penna.,
Distributing Agents for Penn., Del., N. J., Md.

"Chicago" Autograph Time Recorders.

Give Absolute Security to Your Pay Rolls.



The employee registers by SIGNING HIS NAME. The Recorder PRINTS the TIME opposite the space for a signature, and where IT CAN BE EASILY SEEN while signing.

A PERFECT means for keeping CLOSE TIME on PIECE or JOB work.

A system that CANNOT BE BEATEN.

The "CHICAGO" is the ONLY RELIABLE AUTOGRAPH RECORDER EVER made.

We also make a KEY RECORDER.

WRITE FOR CIRCULARS. They tell all about both kinds.

See our exhibit in American section of Furniture Building, Exposition des Invalides. Apply to Frasco-American Co., 162 Ave. Parmentier, Paris.

Chicago Time Register Co.,

11 South Water St., Chicago.

Branches—189 Broadway, New York.

911 Girard Bldg., Philadelphia.

348 Markham St., Toronto, Canada.

5 Bedford Ave., Redcross St., London, E.C.

CHAMPION EGG OPENER.



A perfect working article, once used never without. Gives perfect satisfaction. No daubing or pieces of shell by using this Egg Opener. No competition: fast seller and a money maker. Nickel Plate, 25c; Silver Plate, 50c. Send for discount on large quantities to

PATENTED JAN. 7, 1887
State Iron Age. W. R. HARTIGAN, Collinsville, Conn.

What You Need

is a cash system that will enable you to

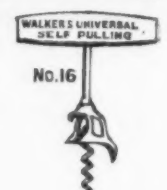
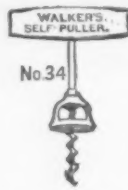
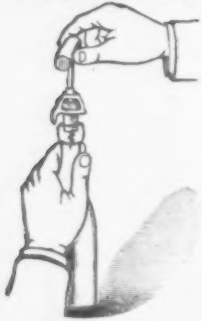
know exactly what you are doing.



We will tell you what we have if you will write for illustrated catalogue.

HOUGH CASH RECORDER CO.,
Indian Orchard, Mass., U. S. A.

See! You Don't
Have to Pull.
A Child Can Do It.



Walker's Self-Pulling Cork Screws

EVERY ONE TESTED AND GUARANTEED.
Several imitations on the market but none as good.

Mfrd. only by ... **ERIE SPECIALTY CO., Erie, Pa., U. S. A.**

NEW YORK STAMPING COMPANY.

North 11th and Berry Streets, BROOKLYN, N. Y., U. S. A.

Manufacturers of Pressed and Stamped Steel Ware Specialties.
Sole makers of the Eclipse Brand Curry Combs, made of the Finest Cold Rolled Steel, in great variety of styles and sizes, and of superior quality and finish, and salable in all the markets of the world; also makers of Fine Polished Steel Cooking Utensils, including the Famous Acme Frying Pans. Catalogue free on application.



STANLEY RULE & LEVEL CO.,

NEW BRITAIN, CONN., U. S. A.

Improved Carpenters' Tools.

SOLD BY ALL HARDWARE DEALERS.



American, Niagara and Eureka Weldless Trace Chains.

ONEIDA COMMUNITY, Limited, Niagara Falls, N. Y., U. S. A.



MEASURING TAPES

Steel, Metallic, Linen, Pocket, Ass Skin, Pat. Leather, Bend and Pressed Leather, etc.



There is not another line of tapes in the market that will equal ours in quality, accuracy, workmanship, neatness and every other way.

LUFKIN RULE CO., SAGINAW, MICH., U. S. A.

New York City Office and Store, - 291 STEWART BUILDING.



CABINET PORTABLE OVENS

for
Bakers,
Confectioners,
Hotels, etc.

Also the best
Oven for
Core Baking,
Japanning,
Enameling, etc.

Send for Catalogue.

The C. S.
Blodgett Co.,
Burlington, Vt.,
U. S. A.



A Great Labor Saver.

Will pay for itself in a single day. Where Steel Giant Grubbers are kept and shown a large trade is soon established. They are a necessity to almost everybody owning land. Moderate price. Large margin of profit to the dealer.

Sample orders solicited and promptly filled.

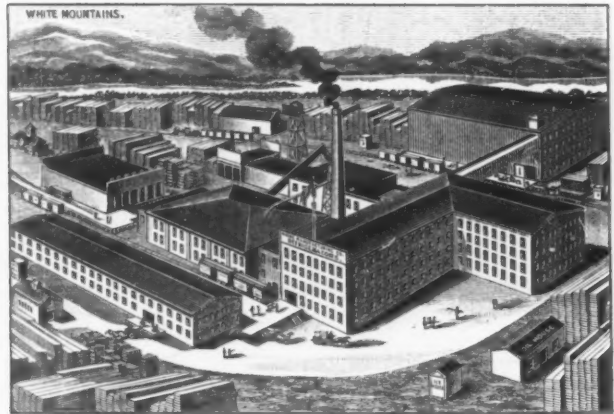
New Century Manufacturing Co.,
48 East 8th Street, New York.

THE FAMOUS

"WHITE MOUNTAIN" AND "MAINE" REFRIGERATORS.



This cut shows one of the world renowned "WHITE MOUNTAIN GRAND" Cleanable Refrigerators.



This cut shows the great factory where these Refrigerators are manufactured.

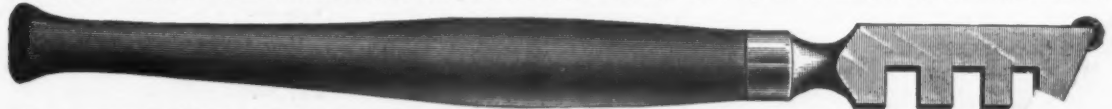
MAINE MANUFACTURING COMPANY,
NASHUA, N. H., U. S. A.

CABLE ADDRESS: "MAINE."

BRANCH OFFICES: Boston, Philadelphia, New York City, Chicago, Ill.;
San Francisco, Cal.; Denver, Colo.; Dallas, Tex.; Portland, Ore.

Barrett's
Glass
Cutters
Standard

Barrett's Practical Glass Cutters are the standard the world over. Sold by more Hardware Dealers than all



other makes combined. Send for prices and sample. W. L. BARRETT, Manufacturer, Bristol, Conn.,

A Ladd's Discount Book is a practical means of rapidly reaching absolutely accurate results without the mental wear of computing. It gives at a glance the net of any sum at a great range of discounts, simple and complex, and it is accurate, rapid and practical. Price, \$3.00; Double Indexed Edition, \$4.00.

R Mailed, postpaid, upon receipt of price by
DAVID WILLIAMS CO.,
232-238 William St.,
New York.

ACCURATE AND RAPID.

QUEEN FREEZER TRIPLE MOTION.

Self Adjusting. Full Size.



Freezes in 1½ to 3 minutes.
Has more good points than any
other Freezer made.
For sale by the leading jobbers.

The SAM'L C. TATUM CO.,
264 Water Street,
CINCINNATI, - OHIO.

REGIS-
TERS
and
VENTI-
LATORS.
NOT IN
COMBIN-
ATION.

Send for
Prices.



Folding Lunch Box

Japanned and Ornamented.
Made in Two Sizes.
Send for Trade Discount.

SEAVEY MFG. CO., Boston, Mass.



THE KNIGHT OF THE GRIP

A SERIES OF DISSERTATIONS ON HIS CONDITION,
CHARACTER AND CONDUCT AS THEY APPEAR TO AN
ORDINARY CHAP WHO HAS STUDIED HIM.

THIS interesting series of papers relating to the personality, methods and experience of traveling salesmen is replete with suggestions and information for both merchants and salesmen, and is written by one who is thoroughly familiar with the Hardware business and many of its representatives on the road.

PRESS OPINIONS:

Interesting and suggestive.—*Cycling Gazette*.
Clear and forcible in its style.—*Printers' Ink*.
Will well repay perusal by both merchants and salesmen.—*Textile World*.

A readable book containing much that is suggestive to those who are looking for the secret of success on the road.—*Hardware Dealers' Magazine*.

Written in easy and entertaining style.—*The Canadian Grocer*.

You will want to begin at the beginning and read it through; it will do you good.—*Boots and Shoes Weekly*.

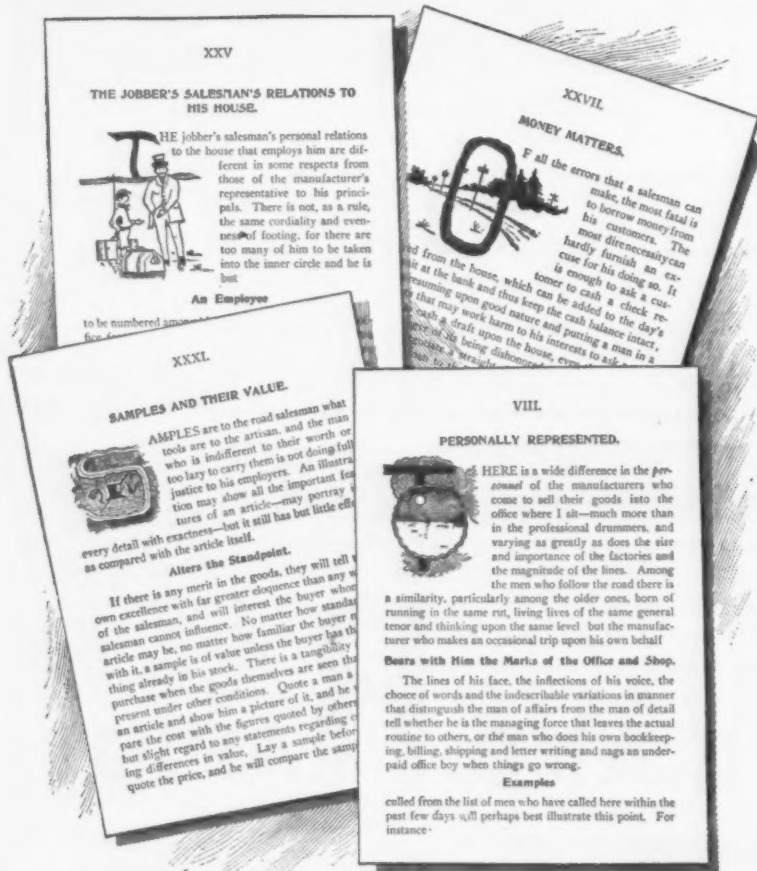
A well gotten up, well printed and well written volume.—*The American Artisan*.

Very interesting; contains information useful to all traveling men and merchants in any line.—*Boot and Shoe Recorder*.

It will also prove interesting to employers, who may get a new view of the life of the knight of the grip.—*Crockery and Glass Journal*.

There is much that the young traveling salesman may learn from this book concerning methods of work and how to attain success.—*The Engineer*.

It embodies the record of actual experiences of traveling men, descriptions of methods pursued with various types of customers, and cannot fail to give to the employer many suggestions in regard to the success of his representatives on the road.—*Manufacturers' Record*.



REDUCED FAC-SIMILE PAGES.

A suggestion of the scope of *The Knight of The Grip* and the many topics treated is offered in the list of chapter headings which follow:

His Position in the Trade.
A Companionable Fellow.
When He Passes.
The Syndicate Salesman.
The Pace That Kills.
Temptations.
The Manufacturer's Salesman.
Personally Represented.
Salesman and Buyer.
Friction.
Sociability with Buyers.
Many Men of Many Minds.

The Veteran.
Gentlemen All.
Time Killers.
The Woman In It.
A Tale of a Tile.
The Salesman and the Office Man.
Wide Awake.
Off the Road.
Treating of Various Things.
The Jobber's Salesman.
The Field of the Jobber's Salesman.

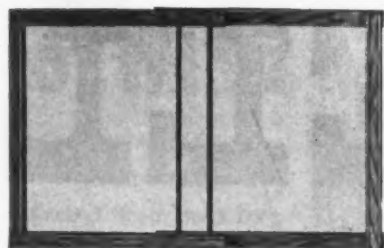
The Retail Trade.
The Jobber's Salesman's Relations to His House.
The Salesman in a Rut.
Money Matters.
Loyalty.
The Buyer Out.
Other Hindrances.
Samples and Their Value.
Judgment and Discretion.
Kindness, Courtesy, Conclusion.

APPENDIX.
The Oldest Hardware Traveler.
The Value of a Buyer's Time.
The Veteran Traveler.
What the Trade Say About Traveling Salesmen.
From an Old Hardware Traveler Travelers Can Give Merchants Pointers.
A Retailer's Day with the Knights of the Grip.

179 Pages. Size 5 x 7 1/4 inches. Cloth Bound.

PRICE, SIXTY CENTS, POSTPAID.

DAVID WILLIAMS COMPANY, Publishers, 232--238 William St., N. Y.



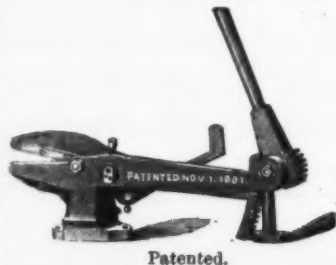
EVERYTHING IN FLY SCREENS.

The Hummer is an ideal screen, practical, durable, well made and handsome. It is the only screen whose adjustment is entirely metallic and, consequently, never binds but always adjusts easily.

SATISFACTION GUARANTEED. INVESTIGATION SOLICITED.

PORTER SCREEN MFG. CO., = Burlington, Vt.

"Eureka" Patent Shear.



Patented.

The most effective implement for cutting wire rods and strip metal.

Should be kept in stock by every hardware dealer.

SIMPLE. DURABLE. STRONG. CHEAP.

Made in two sizes:

- No. 1 cuts round metal up to $\frac{1}{4}$ inch.
cuts sheet metal up to $\frac{3}{8}$ inch.
- No. 2 cuts round metal up to $\frac{1}{2}$ inch.
cuts sheet metal up to 3-16 inch.

THE SMITH & EGGE MFG. CO.,
BRIDGEPORT, CONN.

EASY-ROLLING
IF YOU WANT TO KNOW
ALL ABOUT THE BEST
**SHELF
LADDER**
SEND FOR OUR CATALOG TO-DAY
MORLEY BROTHERS,
123 SOUTH SAGINAW,
TILDEN STREET, MICH.

**MENAGH'S PRICE CARDS
AND HOLDERS.**
Single Frames, holding one
10 x 14 card on each side, with
brackets, \$9.00 per doz. net.
Double Frames, holding two
10 x 14 cards on each side,
with brackets, \$12.00 net.
(Owing to risk of breakage in
transportation, 10 x 14 protect-
ing glasses for cards are not
furnished.)
Price Cards, 10 x 14, 60 cents
per doz. net.
Special Price Book, 400
pages, 10 x 14, \$9.00 each, net.
Quotation Book, 200 pages,
\$7.00 each, net.
Easy Sign Marker, \$1.50
each, net.
Illustrated Circular on Application to
JOHN S. MENAGH,
134 Newark Ave., Jersey City, N. J.

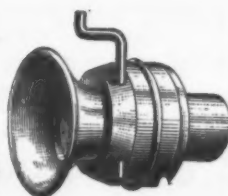


W. R. OSTRANDER & CO.,

22 DEY STREET, NEW YORK.

Manufacturers of
Speaking Tubes, Whistles, Oral, Electric, Me-
chanical and Pneumatic Annunciators
and Bells.

Complete outfits of Speaking Tubes, Whistles, Elec-
tric, Mechanical, and Pneumatic Bells. A full line
always in stock. Send for new catalogue. Factory,
DeKalb Ave., near Knickerbocker, Brooklyn, N. Y.



The Famous Lower Cove
**Nova Scotia
Grindstones**

For sale by
ATLANTIC GRINDSTONE CO.,
892-894 Westminster St.,
PROVIDENCE, R. I.

GOODSELL

Automatic Screw Drivers



DRIVE
SCREWS.

Some Kinds Don't.

GOODSELL-PRATT COMPANY,
GREENFIELD, MASS., U. S. A.

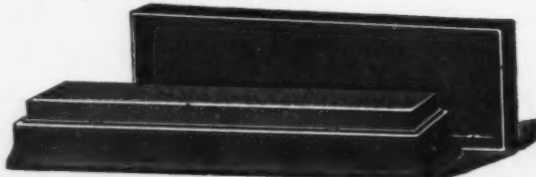
INDIA OIL STONES.

(Manufactured by the Norton Emery Wheel Co., Worcester, Mass.)



Stones even and clear grained throughout.
Remarkable Cutting Qualities.
Great Strength of Material.
Adaptability to all Required Shapes.

EVERY STONE GUARANTEED.



The PIKE MANUFACTURING COMPANY,
SOLE AGENTS,

NEW YORK OFFICE, 151 Chambers St.

PIKE STATION, N. H., U. S. A.

World's Headquarters for SCYTHE STONES, OIL STONES, RAZOR HONES, and SHARPENING STONES
FOR ALL PURPOSES.

Successful Hardwaremen



HANDLE the RELIABLE DEMOREST.

It SELLS and STAYS SOLD.

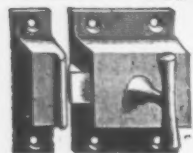
BALL BEARING STAND. MARQUETRY WOOD WORK.

SEND FOR CATALOGUE.

We are prepared to furnish the most *reliable* Machine made for your trade.
as they are strong, simple in construction, beautifully finished and guaranteed
against all defects, we will back it against *any* machine made, at *any* price.

DEMOREST MFG. CO., Williamsport, Pa.

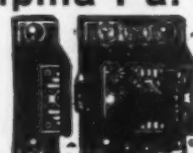
CENTRAL HARDWARE CO., - - - Philadelphia Pa.



Make a number of staple articles of Hardware at sur-
prising low prices.

Get their Catalogue and Figures.

New York Office, C. E. PEABODY, No. 90 Chambers St.



SEWING MACHINES ARE A PROFITABLE SPECIALTY FOR THE HARDWARE TRADE...

With those who have pushed them well they have become really a Staple with special profit; and the trade is awaking to the fact that

**THEY
CONSTITUTE
A
PARTICULARLY
DESIRABLE
LINE
TO
HANDLE.**



FITTED WITH BALL BEARINGS.

We manufacture high quality goods in largest quantities. Have been at it for twenty years.

We supply more of the trade than all other makers combined.

The Hardware Trade is our specialty.

Correspondence Solicited.

NATIONAL SEWING MACHINE CO., FACTORY and HOME OFFICE, **Belvidere, Illinois.**

DEALERS

Wanted in every town to handle the best selling and most complete line of

VARNISHES

IN THE MARKET
SPECIAL INDUCEMENTS

FOR PARTICULARS APPLY TO

STANDARD VARNISH WORKS

THE LARGEST VARNISH WORKS IN THE WORLD.
Factories covering 7 Acres, ELM PARK, STATEN ISLAND, N. Y.

GENERAL OFFICES.

CHICAGO.
2620 ARMOUR AVE.

29 BROADWAY.
NEW YORK.

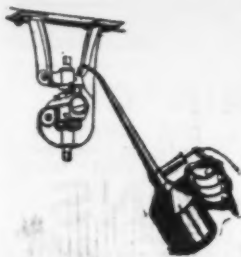
LONDON.
23 BILLITER ST.

Cannon Oilers.

COMBINES Quickness, Economy and Convenience Indispensable to Manufacturers, Engineers and Farmers Will save one-third of the oil; can use any weight oil in any position. Made in all sizes from a half pint to a half gallon. Use one once and you will use no other.

Write for Prices and Circulars.

STOUTENBURG MANUFACTURING CO.,
Keithsburg, Ill.



THE BICYCLE STEP LADDER.

Especially adapted for Hardware Stores



The newest, neatest, simplest, easiest operated and safest store ladder made. Highest Award World's Fair. Write us **THE BICYCLE STEP LADDER CO.**, 65 Randolph St., Chicago, Ill. Eastern Agent, H. N. YOUNGS, 5 Clinton Place, New York City. New York City and vicinity, E. J. HUSSEY & CO., 80 John St., New York City. California, JOHN WOODLOCK, 154-156 First St., San Francisco, Cal. North Western States, HOWE SCALE CO., Portland, Ore. Texas and S. W., E. D. FOY, Dallas, Tex.

AMERICAN SCREW CO..

SCREWS

MANUFACTURERS OF
SCREWS, TIRE BOLTS, STOVE
BOLTS, RIVETS AND BURRS,
WIRE NAILS AND



KINDRED ARTICLES IN ALL VA-
RIETIES OF FORM AND FINISH,
BOTH REGULAR AND SPECIAL.

PROVIDENCE, R. I., U. S. A.

CASTERS



THE
GEM
ROLLER
BEARING.

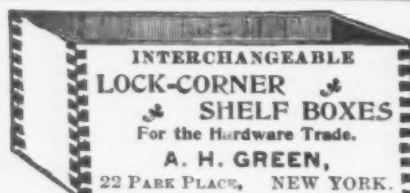
Manufacturers of high-grade Casters
for furniture and trucks. The stand-
ard Caster in the trade for 18 years.
12 sizes of each.

THE
YALE

DOUBLE
ROLLER.



THE M. B. SCHENCK CO.,
Meriden, Conn., U. S. A.
Send for catalogue and prices.

EVERY HAND
SAW

Bearing our own Brand is guaranteed
by us to not only be the equal of
any other make, but better.

Dealers can always
back up this state-
ment to their cus-
tomers for we'll
make good
if not
found
true.



GEO. H. BISHOP & CO.,
CINCINNATI, O., and LAWRENCEBURG, IND.
KEARNEY & FOOT CO., 100 and 102 Reade St., N. Y.
Salaried Eastern and Export Representatives.

CHILLCOTT-EVANS CHAIN CO.,
Manufacturers of

High-grade, Hand-made Stud, Crane, Dredge,
Steam Shovel, Ship, Cable and Wrecker

CHAINS.

We Make Chain of All Descriptions From 1-4 to 2 1-4 Inches.
Office 652 Preble Avenue, ALLEGHENY, PA.

WIEBUSCH & HILGER, Ltd.,

9-15 Murray Street, New York.

San Francisco Office, 105 Front Street, HUGHSON & MERTON.

MANUFACTURERS' AGENTS AND IMPORTERS.**SOLE AGENTS FOR**Essex Horse Nail Co.,
Horse Shoe Nails.Clark & Parsons Co.,
"Lightning" and "Maine" Hay Knives.Challenge Cutlery Corporation,
Successors to Hatch Mfg. Co., and The Challenge Razor Works,
Razors and Farriers' Knives, Pocket
Cutlery, Etc.H. T. Seymour Shear Co.,
Shears and Scissors.

Pope's Farriers' Knives.

Tainter Mfg. Co.,
Taintor Positive Saw Sets.Press Button Knife Co.,
Press Button Knives.Hilger & Sons,
German Hardware and Cutlery.Isaac Nash,
Genuine T. Waldron Scythes.American Shearer Mfg. Co.,
Priest's Hand and Power Horse and
Toilet Clippers.J. T. Henry Mfg. Co.,
Pruning Shears.Ferro Carbon Castings Co.,
"Rex" Hammers and Hatchets.Eyeless Tool Co.,
Eyeless Picks and Tools.Higginum Hardware Co.,
"Acme" Nippers.New York Stencil Works,
Steel Letters and Figures.Needham Bros., Ltd.,
"Repeat" Cutlery and Sheffield Goods.Burgon & Wilkinson, Ltd.,
Sheep and Garden Shears.**NEW YORK MANUFACTURERS' HEADQUARTERS FOR**Bridgeport Chain Co.,
Peter Wright's Anvils,Chesterman's Tapes,
Hoffman's Steels,
Wade & Butcher Razors and Tools.Roses' Trowels,
Brades' Trowels,

Warranted Better than the Best

ENGLISH ANVIL

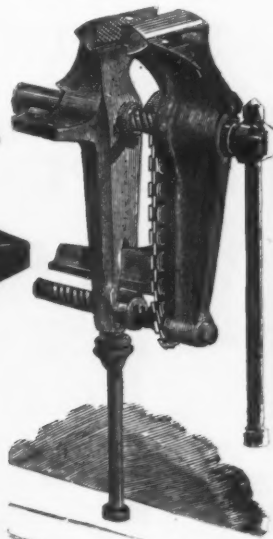
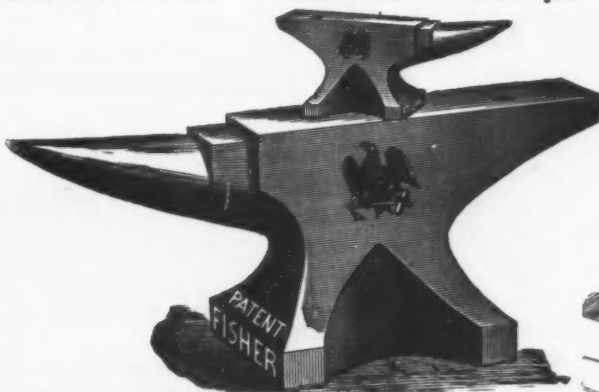
Face in one piece of BEST TOOL CAST STEEL, PERFECTLY WELDED, perfectly true, of hardest temper, and never to come off or "settle." Horn of tough untempered steel, never to break or bend. Only Anvil made in the United States fully warranted as above.

FISHER DOUBLE-SCREW VISE

IS FULLY WARRANTED STRONGER THAN ANY OTHER LEG VISE, AND ALWAYS PARALLEL. Is the best Vise for Machine Shops and Blacksmiths, and for all heavy work. ACCURATE AND DURABLE. Send for Circular.

EAGLE ANVIL WORKS, Trenton, N. J.Sold in New York by our Agents, J. C. McCarty & Co., 10 Warren St.; The Russell & Erwin Mfg. Co., 45 Chambers St.
Sold in Boston by our Agents, Dodge, Haley & Co., 212 High St.ESTABLISHED 1843.
MORE THAN 200 DIFFERENT PATTERNS.

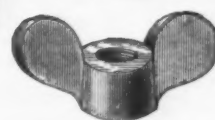
None Genuine without our Trade-Mark.

EAGLE and "FISHER" Stamp.**COMBINATION WRENCH.**

Case-Hardened Throughout. Parts Interchangeable.

This wrench not only combines the superior qualities of a Gas Pipe Wrench, but also all the requisite combinations of a regular Nut Wrench, thus making a combination which has no equal. For Circulars and Price-List, address

Bemis & Call Hardware & Tool Co., Springfield, Mass., U. S. A.

This Wrench can be furnished with long
Nut or Sleeve.**THUMB SCREWS
AND NUTS.**

We manufacture Malleable Iron Socket Wrenches, Thumb Screws and Nuts.

Get Our Prices.

SAM'L HARRIS & CO.,

23 & 25 So. Clinton St., - Chicago, Ill., U. S. A.

**THE NEW DEPARTURE
COASTER BRAKE**



THE ANCIENT WITCH.

THE BEST
THE MODERN WITCH.

SELLING AGENTS
JOHN H. GRAHAM & CO.
NEW YORK CITY.

MANUFACTURED BY
THE NEW DEPARTURE BELL CO.
BRISTOL, CONN. U.S.A.

FREE WHEEL,
TIGHT PEDALS,
ANY SPROCKET,
ROLL BACKWARD.

The STAR HEEL PLATE CO.,

SOLE MANUFACTURERS OF

STAR AND BOSTON HEEL PLATES,



Made in 5 sizes

STAR
LASTS

AND



Made in 4 sizes.

Patent Reversible Iron Standards,
Oval, Chisel, Star and Square Top

IRON STANDS,

Shoe Repairing Outfits, Lap Lasts,
Hob Nails, and a Full Line of
Shoe Repairing Supplies.

Address **LOUIS SACKS,**
63-81 Polk St., Newark, N. J.

WRITE FOR PRICES. . .

PRATT'S CONE BELT SHIFTER

SAVES time to the manu-
facturer, trouble to the op-
erator, and wear to the belts.

Send for Circular.

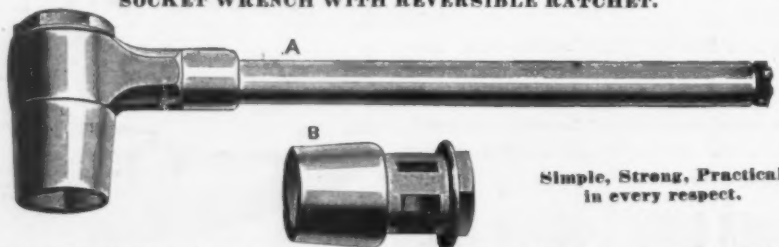
CHANDLER & FARQUHAR,
Boston, U. S. A.



KEYSTONE MANUFACTURING CO. MACHINE TOOLS, RATCHET DRILLS, WRENCHES.

Only first-class material used in the manufacture of these tools. Perfect Mechanical Construc-
tion, High-grade Finish.

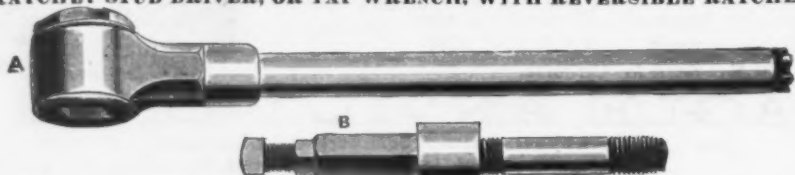
SOCKET WRENCH WITH REVERSIBLE RATCHET.



Simple, Strong, Practical
in every respect.

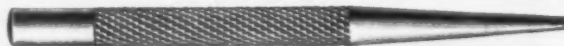
The body of this Wrench is made of Drop-forged Steel. The Nut Socket, cut "B," is Steel; the
handle is of Bar Steel, insuring the greatest possible strength. The Ratchet is entirely enclosed,
preventing dirt or other obstacles interfering with its working. Can be made reversible instantly by
slightly withdrawing the knob at end of handle and making a half turn.

RATCHET STUD DRIVER, OR TAP WRENCH, WITH REVERSIBLE RATCHET.



This tool consists of holder, socket and stud nut. Indispensable in a Machine Shop. Useful
for Boiler Makers, Plumbers, and Steam Fitters' Work. For general utility and economy is
without equal.

Send for
Catalog.



New York Office,
ALDER & BOYD, 37 Warren St.

**NAIL SETS.
KEYSTONE MFG. CO., BUFFALO, N. Y.**



Send for one.

A NEW TOOL. You will like THE "IDEAL" ALL BALL BEARING CLAMP

For Machinists, Model and Pattern Makers.
The Handiest and Most Perfect Clamp.

THOS. HALL, 10 Water Street, BROOKLYN, N. Y.

New York, Dec. —th, 1900.

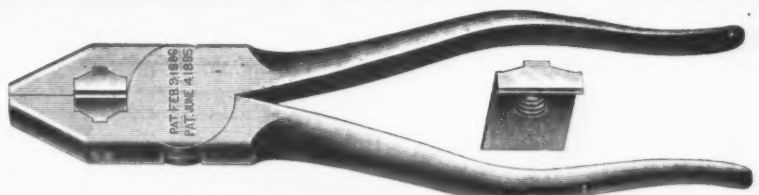
MR. NIPPER AND PLIER BUYER:

Dear Sir: Now is the time to prepare for winter storms. Wire will be broken all over the country. We have all you need. Examine the "Green Book" for nippers, pliers, climbers, connectors and wire tools.

Yours truly,

**SMITH & HEMENWAY CO., &
UTICA DROP FORGE & TOOL CO.,**
296 Broadway, New York.

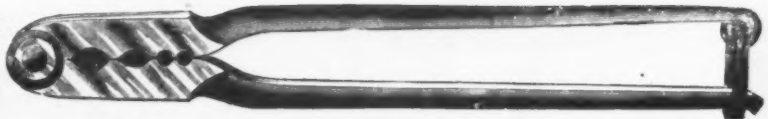
Our No. 90.



Our No. 118.

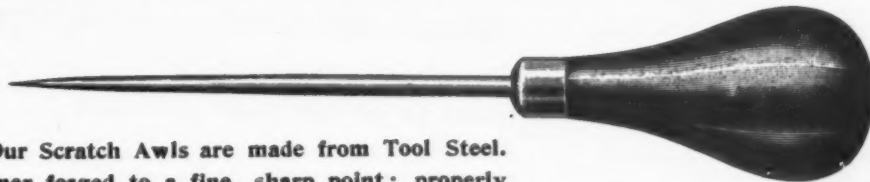


Our No. 713.



MAYHEW'S SCRATCH AWLS.

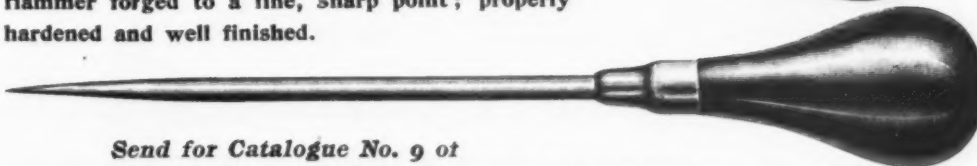
No. 1040.



Length of
Blade, $4\frac{1}{4}$
inches.

Our Scratch Awls are made from Tool Steel.
Hammer forged to a fine, sharp point; properly
hardened and well finished.

No. 1020.



Length of
Blade, $5\frac{1}{2}$
inches.

Send for Catalogue No. 9 of

HARDWARE AND MECHANICS' TOOLS.
H. H. MAYHEW CO., - - Shelburne Falls, Mass., U. S. A.

PATENTED ARTICLES OF MALLEABLE IRON. NEW pattern Heavy Screw Clamps. Strongest in the market.



Hammer's Malleable Iron Oilers, 3 Sizes.
Hammer's Mail Iron Hand Lamps.
Hammer's M. I. Hanging Lamps.
Hammer's Adjustable Clamps.
For sale by all the principal Hardware Dealers.
Send for Price-List.

MALLEABLE IRON CASTINGS,
of superior quality, and Hardware Specialties in
Malleable Iron made to order.

HAMMER & CO.,
BRANFORD, CONN.

The Ironville Hardware Association. Re-
printed from *The Iron Age*. Deals with the pre-
vailing evils of unreasonable competition existing
in the hardware trade, presenting in narrative
form the policy and procedure of a local combi-
nation of merchants. 79 pages, pamphlet.....35c.
For sale by David Williams Co., 232 William St., N.Y.

COES WRENCHES.

The Genuine Improved
KNIFE HANDLE
PATENTED.

SCREW WRENCHES.



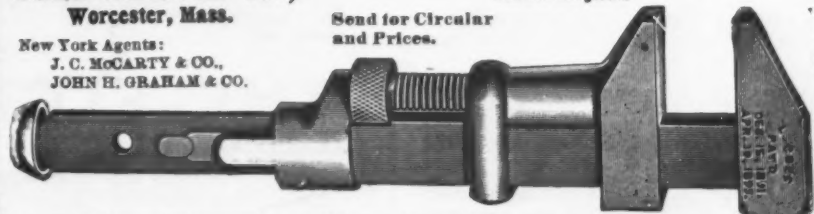
Warranted to be the **BEST MADE** and
STRONGEST WRENCH in the **MARKET**.

COES WRENCH CO.,
Worcester, Mass.

New York Agents:
J. C. McCARTY & CO.,
JOHN H. GRAHAM & CO.

Has a straight bar and extra long nut for
screw in jaw.

Send for Circular
and Prices.



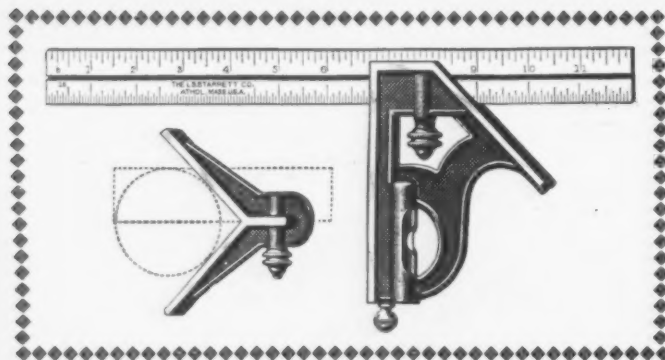
THE ATLAS PATENT PIPE WRENCH.

A HIGH CLASS DROP FORGED STEEL TOOL.

QUICK, EFFECTIVE, POSITIVE in adjustment. The good qualities of Chain
Pipe Wrench and Screw Wrench combined without having the faults of either.
Send for our illustrated folder. We believe it will convince you the wrench
is at least worthy of a trial.



Atlas Pipe Wrench Co.
121 Liberty St., New York.
51 Flood Building,
San Francisco, Cal.



THE REAL THING

When you offer a mechanic a Starrett Combination Square you don't have to waste any time trying to convince him that it is "just as good as" any other square. The chances are that he knows all about Starrett's, and that other combination squares are simply imitations. We have been making Combination Squares for twenty years,—in fact, this is the first tool L. S. Starrett put on the market,—and we have been improving them all the time. The new design shown above seems to be the acme of perfection in its line. See that our name is on the tool, and that the handy little scribe is in the stock.

SEND FOR CATALOGUE No. 16A—112 PAGES—ILLUSTRATED—FREE.

THE L. S. STARRETT CO., Athol, Mass., U. S. A.

NEW YORK STORE, 126 LIBERTY STREET.

STANDARD CHAIN CO.,

PITTSBURGH, PA.

Hardware Chain, Ship Chain, Railroad Chain.

High Grade Chain of all kinds.

PROMPT SHIPMENTS.

WRITE FOR PRICES.



The Largest and Best
Assortment of

GRITS.

Write for catalogue and prices.

**Mounted Grindstones, Loose Stones,
Family Grindstones, Etc.**

THE CLEVELAND STONE CO.

Erie St., Cleveland, Ohio.

Branches: BOSTON, NEW YORK, CHICAGO.

THE ELGIN WRENCH.



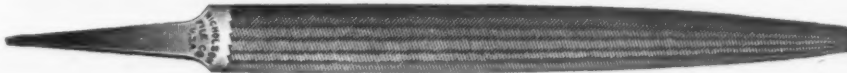
Extra Jaw.

The best general purpose wrench on the market. It will turn a nut, hold a pipe or twist a rod. It is not clumsy, but flat and neat. It is the only adjustable wrench (with its range of work that can be conveniently carried in the pocket. When jaws wear out, old ones can be replaced with new. Nickel plated and perfectly constructed. Write us for prices.

**STAR MANUFACTURING CO.,
CARPENTERSVILLE, ILLS.**

GREAT

Product of
Largest and Most Complete File Plant in the World, Except
the Nicholson. Strictly High-grade. Made and guaranteed by



NICHOLSON FILE CO.,
PROVIDENCE, R. I.,
U. S. A.
WESTERN



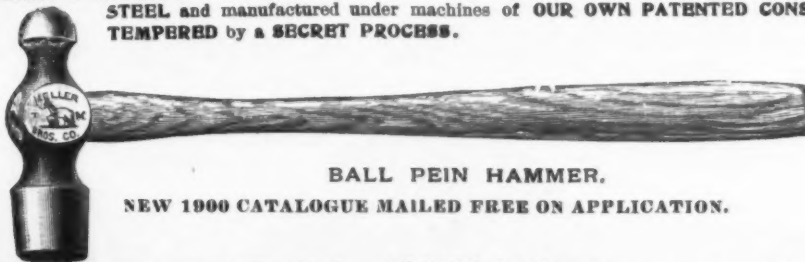
"BEST BY TEST."

"HELLER'S"

THE WORLD'S STANDARD.

Horse Rasps, Files and Farriers' Tools

Have been steadily IMPROVED in manufacture, kept constantly up to date and abreast with the TIMES. Their SUPERIOR QUALITY sets a known and tested STANDARD of EXCELLENCE. Made from OUR OWN PRODUCTION of SPECIAL REFINED CLAY CRUCIBLE CAST STEEL and manufactured under machines of OUR OWN PATENTED CONSTRUCTION as well as TEMPERED by a SECRET PROCESS.

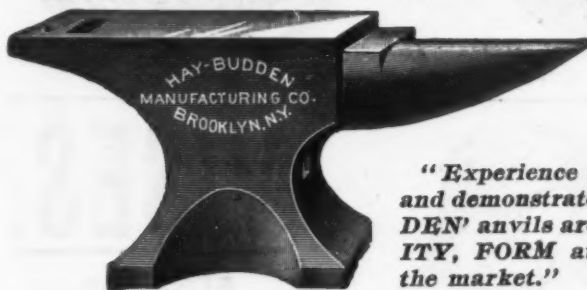


BALL PEIN HAMMER.

NEW 1900 CATALOGUE MAILED FREE ON APPLICATION.

HELLER BROTHERS CO., { Established 1836 } Newark, N. J., U. S. A. { Incorporated 1899 }

"HAY-BUDDEN" Solid Wrought Anvils.



FIRST MADE IN
AMERICA.

Fully Warranted.

"Experience has proven their worth and demonstrated that the 'HAY-BUDDEN' anvils are SUPERIOR in QUALITY, FORM and FINISH to any on the market."

Received Gold Medal, Highest Award for Anvils, at Omaha, 1898.

Hay-Budden M'f'g Co.,

254 NORTH HENRY ST.,
BROOKLYN, N. Y.

Die and Steel Forgings.
Weldless Rings.
Forged Tool Steel
Spinning Chucks.

Superior to steel castings.

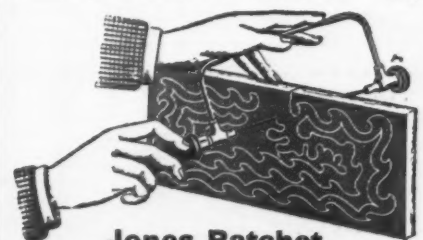
Our steel is made expressly and solely for us. Dies forged under our system will cut 10 to 25% more blanks than others before regrinding.

CHAMPION TOOL CO., Limited,
CONSAUT LAKE, PA.

The largest and most complete line of Farriers' Tools on the market.



All genuine tools marked CHAMPION.



Jones Ratchet
COPING SAW.

Can be quickly set at any angle. Well made, low in price. Send for circular.

JONES & DOMMERSNAS,
31 and 33 Indiana St., CHICAGO.



ATHOL MACHINE CO.,
Athol, Mass., U. S. A.

Manufacturers of
Vises, Meat Choppers,
Mechanics' Fine Tools, &c.
Send for Catalogue.

The World's Greatest File Works.

ESTABLISHED 1842.



THE ARCADE FILE WORKS at Anderson, Indiana, is the largest and most completely equipped plant for the manufacture of Files in the world.

The highest inventive genius and mechanical talent has been concentrated on ONE Modern Plant, which is directed by master minds—originators of a distinctly improved product—machinery and methods up-to-date.

Back of an Arcade File stands this guarantee: That our Arcade File will cut faster, and wear longer than any other file on the market, and as an "earnest" of this guarantee, The Arcade File Works will send to any responsible Hardware Jobber, Wholesaler or Retailer, one dozen Arcade Files, to become the property of the receiver or returned at our expense if the guarantee is not fully borne out in every particular.

NEW YORK CITY, 97 Chambers St., 79 Reade St. WORKS, ANDERSON, IND. CHICAGO, 118 Lake Street.

SLOCOMB'S MICROMETERS

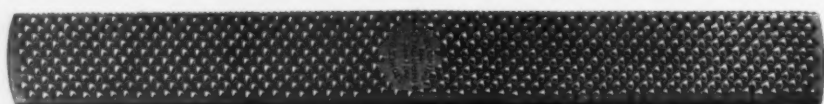
Are Reliable.

All frames are drop-forged from bar steel. All wearing surfaces are hard. Best adjustments for wear at all points.

Catalog if you will ask for it.

J. T. SLOCOMB & CO.,
PROVIDENCE,
R. I., U. S. A.

FULL SIZE CUT OF $\frac{1}{4}$ INCH.



Sole Manufacturers of the celebrated

STOKES BROTHERS HORSE RASPS and ST. CRISPIN SHOE RASPS
STOKES BROS. MFG. CO.,
FREEHOLD, N. J., U. S. A.



McCAFFREY FILE CO.,
PHILADELPHIA.

ESTABLISHED
1863.



Highest Award:
Silver Medal & Diploma.



Le Count's HEAVY STEEL DOG.

MANUFACTURED BY

WM. G. LE COUNT

Successor to C. W. Le Count,

SOUTH NORWALK,
CONN.

Send for Catalogue "B" showing full line of

MACHINISTS' TOOLS.

SEAVEY'S PATENT MITRE BOX

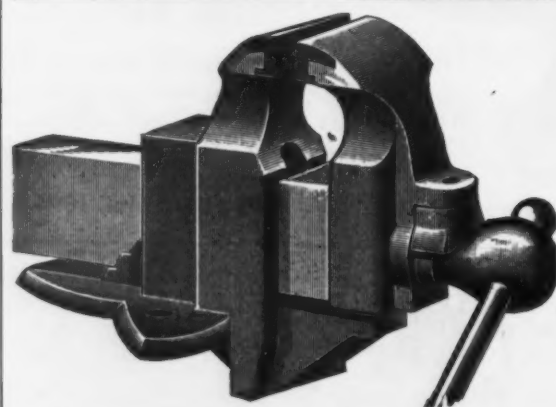
List. \$30.00 per doz.



May be mounted to cut stock any width or thickness.
THOMSON BROS. & CO., - Lowell, Mass.

New York Office:

SMITH & HENNERWAY CO., - 296 Broadway, New York.



VICES.

SEND FOR CATALOGUE.

HOWARD IRON WORKS,
BUFFALO, N. Y.

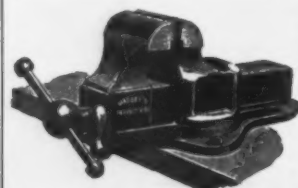
Also Manufacturers of Passenger and Freight Elevators, Electric, Hydraulic and Hand Power.

The King of Quick Acting Vises

Our cat. will tell you how to catch everything quickly and firmly. Write to us for "hints" how to buy and sell vises.

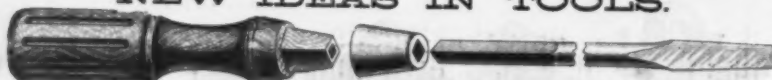
Massey Vise Co.,

Chicago, U. S. A.



B
E
S
T

NEW IDEAS IN TOOLS.



Can You Conceive of Anything Better?

Send for Catalogue.

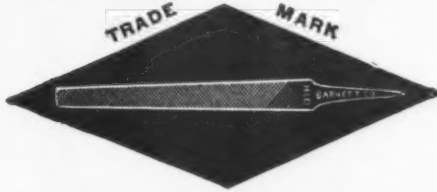
BRAUNSDORF-MUELLER CO., Elizabeth, N. J.

M
A
D
E

BLACK DIAMOND FILE WORKS,

Established 1863. Incorporated 1895.

Twelve Medals of
Award at
INTERNATIONAL
Expositions.



Special Grand Prize
GOLD MEDAL,
Atlanta, 1895.

G. & H. BARNETT COMPANY.

PHILADELPHIA, PA.

J. M. KING & CO.,

WATERFORD, N. Y.

Manufacturers of

BUTTON'S Pat. Wire Cutter AND PLIER COMBINED.

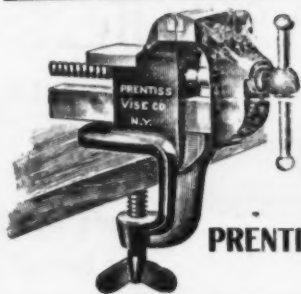


Specially Adapted for Use on Wire Fence.

Also manufacturers of BLACKSMITHS' and
MACHINISTS' STOCKS and DIES, PLUG and
TAPER TAPS, HAND, NUT and SCREW TAPS,
PIPE TAPS and REAMERS.

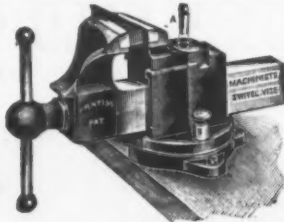
Price-List on Application.

Established by DANIEL B. KING, 1829.



We make all
kinds and sizes
of Vises.

Descriptive Catalogue Free.



PRENTISS VISE CO., 44 Barclay Street, New York.

Sole Agents for Great Britain: CHAS. NEAT & CO.,
112 Queen Victoria St., London, E. C.

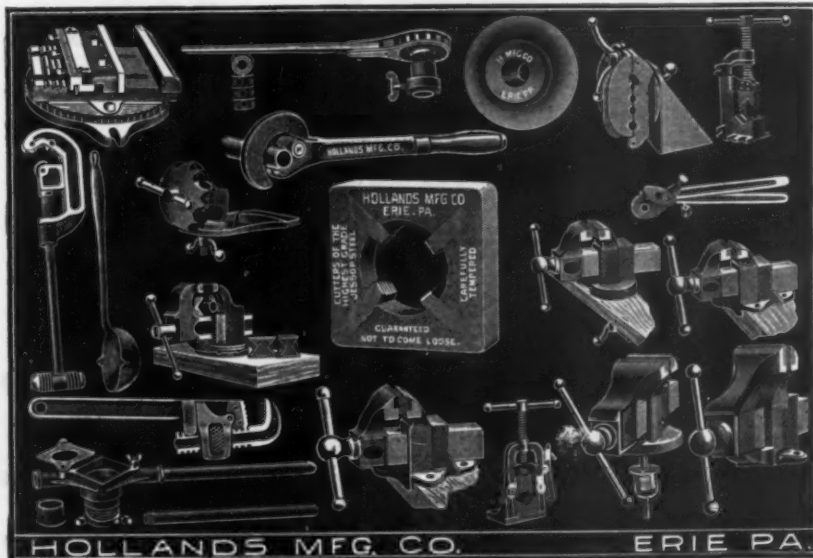
Lewis Patent Quick-Acting Vise

Durable, Powerful
and Tenacious
as any Screw Vise.

Commence to draw as soon as lever
is started and have sufficient gather
for any kind of work.

Send for Illustrated Catalogue.

LEWIS TOOL CO., - 44 Barclay St., - NEW YORK



HOLLANDS MFG. CO.

ERIE PA.



Decided improvement. Less friction. Can be
changed from a roller to a three-wheel cutter.
Extra wheels in the handle. Send for catalog.

TRIMONT MFG. CO., Roxbury, Mass., U.S.A.

L. A. EUCKER STAMP WORKS.

LITTLE FERRY, Bergen Co., N. J.

Die Sinkers, Steel
and Brass Stamps,
Seals, Stencil Dies
for Stencil Cutting,
Die Letters, Stamping Letters, Brands,
Badges and Medals, Key Checks, Door and Name
Plates, Experimental Work, etc.

GEO. M. NESS, Jr.

ENGRAVER AND DIE SINKER,
61 FULTON ST., N. Y.

STEEL STAMPS,

Steel Letters and Figures,
Burning Brands, Stencils, &c.

MACHINE ROUTING FOR
THE TRADE.



THE Tain-
for Pos-
tive Saw
Set 28 has every good
point possessed by any
othersaw set, besides a
number
peculiar to
itself.

Wiebusch & Hilger, Ltd., Agents,
9 to 15 Murray St., NEW YORK.

Hand Elevators and Dumbwaiters

made to be sold by the Hard-
ware trade. Can be placed in
position by any carpenter. Cat-
alogue free.

ENERGY ELEVATOR CO.,
408 Cherry St., Phila., Pa.

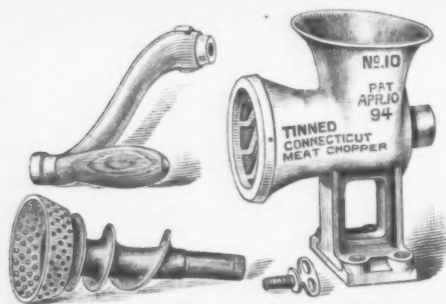


SCHWEDTLE & SIEBERT,

BRIDGEPORT, CONN.

CONNECTICUT MEAT CHOPPERS

THE NEW CONNECTICUT CHOPS and PULVERIZES.



ONLY
TWO
PARTS
TO
CLEAN

In three sizes, 8, 10, 12. For Butchers, Marketmen, Farmers, Poultry Breeders, Hotels, Restaurants and Public Institutions. For smaller sizes order "THE NEW CONNECTICUT," No. 20, 40, 60.

New York Office,

W. H. JACOBUS,
No. 90 Chambers St.

C. M. AVERY & CO.,

Direct Representatives,
165 Lake St., Chicago, Ill.

Housekeepers can now
DO IT ALL with a - -

SINGLE MACHINE.



DOES
IT
ALL

FOOD
No. 2.



Vegetables,
FRUITS,
CLAMS,
HASH, ETC.

MEAT
No. 1.



PEANUT BUTTER
CHOCOLATE,
No. 3.



COCOANUT,
CRACKERS, ETC.

ONLY TWO PARTS TO CLEAN.

Manufactured by

O. B. WOODRUFF,
Pottstown, Pa.

The Peoria Washers



NO. 2 COMPOUND LEVER.

are the strongest, best made machines for the purpose on the market to-day. They have Cedar Tubs with Galvanized Hoops. Inside castings, Tinned Malleable Iron. Leg brackets, malleable iron and bolted to tub with Tinned Bolts. Will wash as well as by hand, with less than $\frac{1}{4}$ the labor.

Manufactured by

CLARK, QUIEN & MORSE,

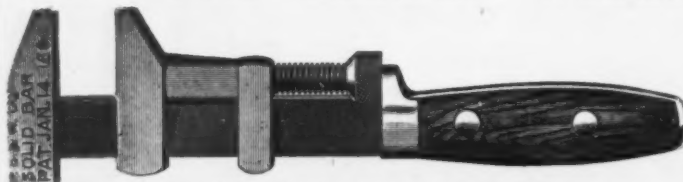
402 S. WASH. ST., PEORIA, ILL.



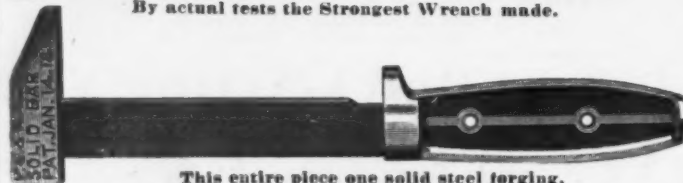
NO. 3 ROTARY.

STEEL
HARDWARE
SHELF
BOXES
ANY SIZE TO
FIT YOUR SHELVING
SEND FOR CATALOGUE.
HELLER BOX CO.
MONTCLAIR, N.J. U.S.A.

THE SOLID HANDLE WRENCH



By actual tests the Strongest Wrench made.



This entire piece one solid steel forging.

Every Wrench Warranted.

Manufactured by

THE PECK, STOW & WILCOX CO.,

Southington, Conn.,

and New York, U. S. A.

Send for Circulars and Prices.

THE ONLY
Screw
Wrench
made with
the bar of
ONE PIECE,
thus
securing
greatest
possible
strength.

LIVE HARDWARE MEN USE
PERFECT SHELF BOXES

WE MAKE
PERFECT SHELF BOXES

WRITE FOR
CATALOGUE AND PRICES.

C. P. MOORE,
RAVENSWOOD, W. VA.

HARDWARE
SHELF BOXES.

Made of Wood
No screws or
nails used to work
out and cut
your shelving.

Look the matter up. Descriptive circular with
set of references and prices mailed on request.
We also make a general line of Paper Boxes.
THE JESSE JONES PAPER BOX CO.,
615 and 617 Commerce St., Philadelphia.

Coffee Mills.



Mills that grind Easily and Quickly
and don't get out of order Easily,
nor wear out Quickly, are the kind
we make.

100 SIZES AND STYLES

to suit everybody. Send for Cata-
logue and Prices.

LOGAN & STROBRIDGE IRON CO.,
NEW BRIGHTON, PA.



SAMSON SCREW DRIVERS
BITS ARE O. K.

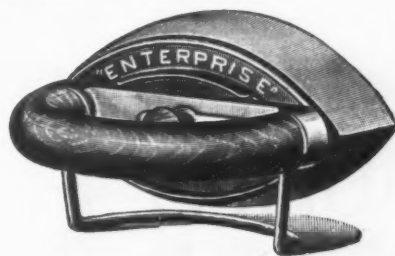
Send for catalogue of tools to
SAWYER TOOL CO., Fitchburg, Mass



SHOWING POSITION OF WIRE REST
WHILE IRONING

"ENTERPRISE" COMBINATION HANDLE FOR "ENTERPRISE" (MRS. POTTS') COLD HANDLE IRONS

We have greatly improved "THE BEST" Handle by the addition of a WIRE REST which does away with the old style stand and prevents the Iron when not in use from being scratched or defaced



SHOWING POSITION OF IRON WHEN WIRE REST
IS USED AS A STAND

All sets of "ENTERPRISE" Cold Handle Sad Irons will be furnished (when so ordered) with the Combination Handle at a slight advance

ALL THE LEADING JOBBERS SELL THEM
Write for our descriptive Catalogue

PRICES
No. 100, "THE BEST" Handles - - \$2.50 doz.
No. 200, "THE BEST" Handles with Wire Rest - - - - \$3.00 doz.

The Enterprise Mfg. Co. of Pa.

N. Y. Branch, 10 Warren Street

Philadelphia, U. S. A.

San Francisco Branch, 105 Front Street

Gray Flint Enameled Ware

Manufactured by

KEEN & HAGERTY MFG. CO.,

Main Office and Salesroom, 16 West Baltimore St., Baltimore, Md.

New York Salesroom, 31 Cliff Street.

Chicago Salesroom, 1115 Chamber of Commerce.

Philadelphia Salesroom, 116 Market Street.

San Francisco Salesroom, 123 California St.

We make all descriptions of Pieced, Heavy Polished, Stamped, Japanned and Gray Flint Enamelled Ware.

Write for Illustrated Catalogue, No. 42, showing FULL LINE.



The Sterling Chopper AND The Sterling Slicer.

TWO UNEQUALED KITCHEN TOOLS.

Have you seen the slicer? It's just out.

N. R. STREETER & CO.,

ROCHESTER, N. Y.



WE CAN FURNISH.....

Pitcher Spout Pumps With Enameled Cylinders.

Enameled Cylinders and Valve Seats

For All of Our Pumps.

Write for cat and prices on our reliable
Lift, Force and Tank Pumps, Hydraulic
Rams, Double-Acting "Century" Pumps,
Iron and Brass Cylinders, Cast Iron Sinks.

THE HUMPHRYES MFG. CO.
Mansfield, O.



PUMPS

Iron Hand and Wind Mill.

SINGLE and DOUBLE
ACTING PUMPS
for all purposes.

CAST IRON SINKS,
SINK BRACKETS.

SEND FOR CATALOGUE.

The Barnes Mfg. Co.,
Mansfield, O.



"Take off your Hat to Myers!"

THE BEST PUMP ON EARTH

Patent Glass Valve Seats,
and
Expansive Buckets.



Write us for prices on
the most admired
Force, Lift, Tank
and Spray Pumps,
Forks and Hay
Carriers on Earth
Manufactured by
the Largest Pump
and Hay-Tool
Works in the World.
323-page
Catalogue Free.
The Right Time to
Write is Right Now!

F. E. MYERS & BRO., ASHLAND, OHIO.

**ECONOMIC
WATER
SUPPLY**

**TRIPLEX
POWER PUMPS**
FOR GAS ENGINE OR
ELECTRIC MOTOR.

PUMPS FOR ALL PURPOSES

THE DEMING CO.
MANUFACTURERS
SALEM --- OHIO

HENION & HUBBELL
SOLE AGENTS
109 North Jefferson St. CHICAGO

THE WORLD'S BEST
WATER PUMP



Nickel Plated Brass, Suc-
tion and Force House

PUMPS

Strong, Light, Durable.

Send for Catalogue.

ATHOL PUMP CO.
Athol, Mass., U. S. A.

The Man with the Hoe

is all right. So is the man with the Edson Mfg.
Co. Diaphragm Pump. He can lift 3500 gallons
of water per day without help.

Send for Catalogue A.

EDSON MANUFACTURING CO.,
132-136 Commercial St., Boston, Mass.

COPPER,
FORCE,
WELL,
CISTERN,
and
AIR CHAMBER

PUMPS.

S. WILDER & CO.,
HOLLISTON, MASS., U. S. A.
Send for catalogue and prices.

STAR WIND MILLS,

All Kinds and Sizes.

"Hoosier" and "Fast Mail" Iron Pumps.

Secure the Agency for 1908.

Galvanized Steel Star Back Geared Wind Mills.
Galvanized Steel Star Direct Stroke Wind Mills.
Galvanized Steel Power Wind Mills.
Wood Star Wind Mills.
Water Tanks, Wood or Steel.

Tabular Well Tools, Valves, Tubular Well Points, Drive Well
Points, Working Barrels, Hose and Hose Goods, Pipe and Fit-
tings, Hydrants and Street Washers, all kinds of Water Supply
Goods.

Estimates and advice furnished on Steel Sub-Structure work
of all kinds.

Largest and finest equipped factory in America for this class
of goods.

Inquiries respectfully solicited. Catalogue with discount
sheet mailed on application. Address

FLINT & WALLING MFG. CO., 60 Oak St., Kendallville, Ind.



Red Jacket Galvanized Pipe.



Made in Sizes 1 to 3 Inch.

Especially for PUMP WORK,

IS ALSO
SUITABLE FOR **STEAM, GAS and WATER PIPE,**
MINING and IRRIGATING.

It is light, but has great strength, and has been tested over 1000
pounds pressure. Write for circulars and net prices.

RED JACKET MFG. CO., Davenport, Iowa, U. S. A.



THE LARGEST LINE OF
ICE TOOLS and
LEMON SQUEEZERS

MADE IN THE UNITED STATES

ARE MANUFACTURED BY

A. C. WILLIAMS,

RAVENNA, OHIO, U. S. A.,

To whom send for catalogue of
House Furnishing Specialties
and Hardware.

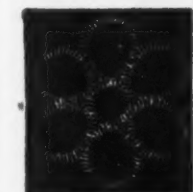
SURPLESS, DUNN & CO.,

35 Warren Street, - - New York.

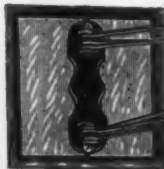
Export Sales Agents.



THESE THREE ARTICLES
ARE THE BEST OF THEIR KIND.



Tea or Coffee Pot Stand, one
piece of wire, retinned.



TOWEL RACK.
HAS NO EQUAL.



Manufacturers of Woven Wire
Hammocks, Steel Hat Racks,
Wire Door Mats, etc.

Toaster and Broiler,
made of coiled wire, re-
tinned.

SAMPLE ORDER SOLICITED.

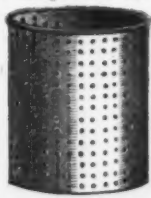
LLOYD MANUFACTURING CO., - - MINNEAPOLIS, MINN.
BOWERBY BRIDGE, YORKSHIRE, ENGLAND.

THE 1898 NATIONAL
SAUSAGE STUFFER AND LARD PRESS.

(Patented September 14, 1897.)



SWINGING
ARCH
and
REMOVABLE
CYLINDER.



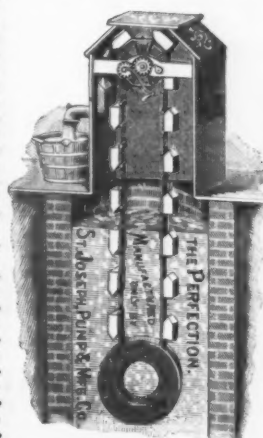
ESPECIALLY
CONVENIENT
FOR
LARD
PRESSING.

Send
for
Circular.



NATIONAL SPECIALTY MFG. CO., Lehigh Ave. and Third St., Philadelphia, Pa.

There Never was



a time that
clear, purified
water
did not gladden
the household.

It lightens
the laundry
labors, gives
cook satisfaction
and charms entire
family at table.
Ask your
jobber for
the

**Water
Purifier**

that never
fails in duty.
Mention its
advantages
to your
trade and
the big demand
will be even
greater for

IT IS THE SIMPLEST STRUCTURE FOR RAISING WATER.
THE CONTAINER GUARANTEED NEVER TO FREEZE.

"PERFECTION"
BUCKET PUMPS.

Write for sample outfit to-day.
Catalog free.

ST. JOSEPH PUMP & MFG. CO.,
St. Joseph, Mo., U. S. A.



STAR
Food
Chopper

Is unquestionably the best machine of its kind ever
offered to the public. It will cut without crushing
raw or cooked meat, sea food, fruit, vegetables, etc.,
into coarse or fine pieces, according to the cutter
used, of which three accompany each chopper.

It has eliminated all the objectionable features of
other choppers and has added several improvements
that are distinctly its own. It is always in order and
the knives require no sharpening.

An additional and exclusive feature of the **Star**
Food Chopper is a plate hinged at the top of the
hopper which, when pressed on the food to be cut,
forces it upon the feed screw, thus preventing the
possibility of injuring or soiling the fingers, which is
liable to occur in using other choppers.

For sale by all dealers.

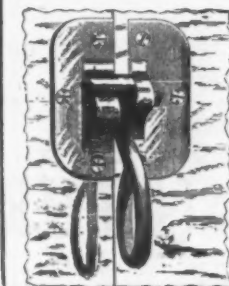
CHAS. D. BROWN, Sole Agent,
160 Duane Street, New York City.

WIRE GOODS AND
HARDWARE SPECIALTIES.



25 Styles Mincing Knives.

The Kilbourne Mfg. Co., Fair Haven, Vt., U. S. A.



"CONROY"
Refrigerator
Door Fasteners

P. J. CONROY,
Philadelphia, Pa.
Station U.



OPEN.

"LIGHT RUNNING" WASHING MACHINE.

Every Machine Sold Under a Positive
Guarantee.

Never leaks or drips. Rigidly built. Splendidly finished. Will wash plain clothes or the finest laces or needlework without the least injury to them—it never rubs off a button or breaks a thread, or tears the clothes in any way. Wood parts of Red Cypress. All metal parts coming in contact with the water are made of Aluminum and will not rust.

Manufactured Exclusively by the

Chattanooga Washing Machine and Wringer Co.,

CHATTANOOGA, TENNESSEE.



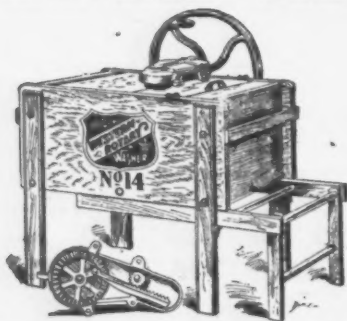
Aluminum Oil Heaters.

235,000 IN USE.

NOVELTY MANUFACTURING CO.,

Jackson, Mich., U. S. A.

THE NEW WESTERN ROTARY WASHER.



No complicated gearing to get out of order or broken. Simply one large pinion fastened on the shell or cover; one small pinion attached to the post; another small pinion meshing in the large one attached to shaft, and the Rack Bar; that's all. Washer operates right or left, the large hand wheel is attached to side of tub, does not have to be lifted with the cover; when latter is down it is always ready for business.

THE ANTHONY WAYNE MFG. CO.,
Ft. Wayne, Ind.

WE MAKE THE
**Squeeze Dry
LEMON SQUEEZER.**

HAGEN & REID, Troy, N. Y.

WHITE MOUNTAIN FREEZER

The Standard of Excellence Everywhere
SOLD BY ALL LEADING JOBBERS.
SEND FOR CATALOGUE.

THE WHITE MOUNTAIN FREEZER CO.,
NASHUA, N. H.

Quickest
Freezing

Best
Results

Economical
Durable

ALL
REPAIRS
FREE

"BLACK HAWK"

**BLACK HAWK
CORN SHELLER.**

Best Sheller made.
Instantly Clamped to
any Box.

CAPACITY
8 to 14 BUS.
PER HOUR.

BEWARE OF
IMITATIONS.
AGENTS
WANTED.

A.H. PATCH CLARKSVILLE
TENN.

Parker's Ball-Bearing, Rapid-Grinding Coffee, Spice and Drug Mills.

Large
variety
of sizes
and
styles.

Send
for
new
catalogue.



Also the Famous Parker Gun and a large
line of Hardware Specialties.

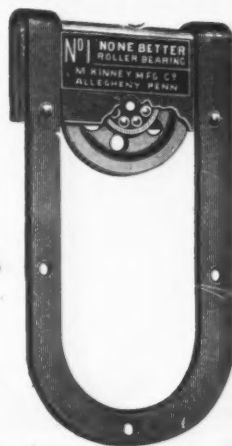
The Charles Parker Co.,
MERIDEN, CONN.,
and 32 Warren St., New York.

Steel Goods.

Door Hangers,
Door Track and Stay Rollers,
Door Hinges and Butts,
Felloe Plates and Washers,
Warehouse Trucks and Specialties.

McKINNEY MFG. CO.,

ALLEGHENY, PENN.



THE OGDEN

Automatically Regulated

Liquid Door Check and Spring.



Easily Applied.

Positively Regulated.

Refilled Without Removing.

Cannot Leak.

The ONLY Check that FULLY controls the Door.

FULL DESCRIPTIVE CATALOGUE.

APPLY TO

OGDEN MFG. CO., - Newark, N. J.

The MILBRADT ROLLING

STEP LADDERS



have the highest recommendation from thousands of customers. They are the handsomest and easiest - running ladders made; work noiselessly, and are absolutely safe and durable. Ladders are made to order and to fit all kinds of shelving, in various styles, to suit all purposes.

Write for
Descriptive
Catalogue.

Address

[G. A. Milbradt & Co.,

1922 and 1924 N. Broadway, St. Louis, Mo.

Or JOHN CALANDER,

148 E. 8th St.,

St. Paul, Minn.

Our line of hardware specialties is a business lever that will put new life into the most lethargic trade. Our goods are so well and favorably known that the trade mark sells them wherever it is shown. We manufacture six popular styles of Spring Hinges. Our leading design is called "The Chicago." We also make a superior line of Door Springs. Our prices are low in comparison to the high quality of our goods. All orders shipped promptly. Catalogue free. CHICAGO SPRING BUTT CO., Chicago. New York.

HOLLOW METAL

Window Frames and Sash,

Glazed with Wire Glass,



Are
Abso-
lutely

Fire
Proof

BETTER THAN CLOSED SHUTTERS
SEND FOR CATALOGUE "A."

They are indorsed by Fire Underwriters and supplant fire shutters wherever advocated.

THE SMITH-WARREN CO.
East Cambridge, Mass., U. S. A.

Why is the



Patented 1898.

Because it is the only **ROTARY WASHER** that has **Revolving Steel Ball Gearing**, therefore light running and noiseless. No escape of steam; made of red cypress lumber; solid leg staves (not removable, breakable legs); wheel turns either way; dasher reverses automatically, cleaning clothes without rubbing them to pieces. Made to last.

H. F. BRAMMER MFG. CO.,
Davenport, Iowa.



Our Specialties
are
Bits and Snaps.
DON'T YOU
WANT OUR
CATALOGUE?

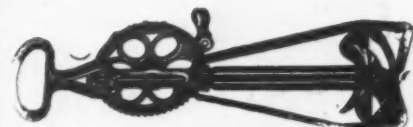
IMPERIAL
BIT & SNAP CO.,
Racine, Wis.
770 Wis. St.

WRIGHTSVILLE HARDWARE CO.

Manfrs. of
Gate, Blind and Shutter Hinges, Gate Latches,
Frame Pulleys, Casters, Shelf Brackets, Sash
Lifts, Drawer Pulls, Hooks, Thumb
Latches and other goods.

SEND FOR CATALOGUE.

WRIGHTSVILLE, PA.



158,062 lbs. of Iron and Steel have been made into
Lyon Egg Beaters and Cream Whips. Send
for New Price-List Circular.

Nelson Lyon, Sole Manuf., 52 Green St., Albany, N. Y.



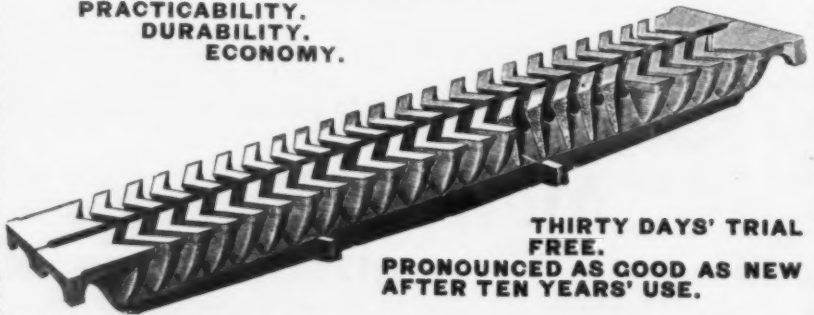
CATALOGUES

- No. 1, GENERAL.
- No. 2, REGISTERS.
- No. 3, RAILROAD HANGERS.
- No. 4, WIRE WORKERS' GOODS.
- No. 5, HANGERS AND RAIL.
- No. 6, MALLEABLE HARDWARE.

THE CELEBRATED HALL GRATE BAR.

IMPROVED.

PRACTICABILITY.
DURABILITY.
ECONOMY.



THIRTY DAYS' TRIAL
FREE.
PRONOUNCED AS GOOD AS NEW
AFTER TEN YEARS' USE.

USED IN THOUSANDS OF FURNACES AND FOUND PERFECT.
HIGHEST MERITS IN EVERY FEATURE.

Write
for
Circular
and
Price.

STOWELL MFG. & FDRY. CO.,
SOUTH MILWAUKEE, WIS.

THE LAST MERRY CHRISTMAS

OF THE CENTURY,
BUT WE WILL SEE YOU LATER
ON

DOOR HANGERS
WILCOX MFG. CO., AURORA, ILL.

DO YOU know what a Poised Carrier is? If not, buy and sell the Coburn Rolling Door Hangers and you will get them, and you do not get them with any other make. They will when used in conjunction with the Coburn Round Trough Trolley Track be found to be the "Ne Plus Ultra" in door hangers.

The Coburn Trolley Track Mfg. Co.,

Holyoke, Mass., U. S. A.

THE DROUVE VENTILATOR

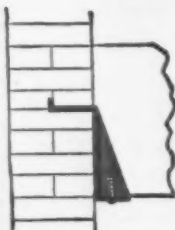


The best and cheapest Ventilator on the market. Made in all sizes. Send for catalogue and prices.

**THE G. DROUVE
COMPANY,**
Bridgeport, Conn.

Skylight and
Sheet Metal Work

ARE YOU BUILDING?



Don't weaken the Joists or Headers or Walls by cutting into them. Use hangers. We make all sizes.

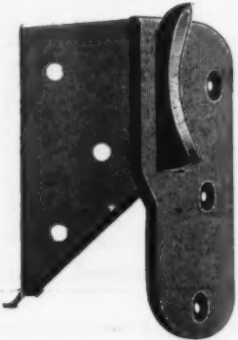
Send for Hanger List.



THE W. J. CLARK CO., Salem, Ohio.

Schroeder's Patent Hangers and Fasteners

For Storm Sash and Screens.



Invisible Hanger.



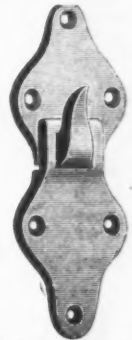
Schroeder's Patent Fastener. 10 inches Long.

Made from Wrought Steel. Light and Strong.

With these hangers storm sash can be very easily and quickly put up or taken down *without the aid of ladder, nails, screws or tools of any kind.*

The fastener permits the sash to be swung out for ventilation or cleaning.

The most perfect device made for hanging storm sash and screens.



Visible Hanger.

FOR SALE BY LEADING JOBBERS. SEND FOR CIRCULARS.

THE STANLEY WORKS,

New Britain, Conn.
79 Chambers St., N. Y.



The New Union Steel Hanger WITH THE Lawrence Serrated Wheel.

THE LAWRENCE STEEL WHEEL

consists of two serrated steel discs, extending to within five-sixteenths of the circumference and the point of serration projecting from each disc to the opposite, forming an inside tread to fit all Bracket Rails.

THE UNION HAS AN ENDLESS RUN WITHOUT FRICTION.

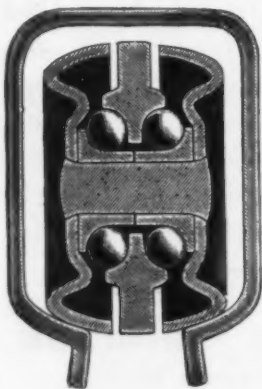
THE UNION STEEL CHANNEL BAR with our New Raised Bearing gives an even surface for the Bolt to rest on. The only Rail which will not sag vertically nor warp horizontally.

THE STRONGEST AND BEST HANGER FRAME KNOWN.

Apply for Circulars and Prices.

LAWRENCE BROTHERS, - STERLING, ILLINOIS.

Manufacturers of Steel Strap Hinges, Door Hangers, Pulleys, and other Hardware Specialties.



To secure the best device on the market for hanging sliding doors, order the McCabe Ball-Bearing Door Hanger. Write for catalogue and prices. The McCabe Hanger Mfg. Co., 540 W. 22d Street, New York.

The Walda Sectional Window Weight.



Square and Round Weights Hang exactly from centre. Only 10 inch pockets required. Eliminates use of lead weight.

The Hardware Dealer

with one-sixth the stock required in one piece weights can fill any order. Weight crated with 100 lbs. in a box, both plainly marked.

The Contractor

saves time, money and delay by balancing windows exactly at once.

SEND FOR CIRCULAR.

Barney & Reed M'fg Co.,

85 Water Street, - BOSTON, MASS.

SASH WEIGHTS.

E. E. BROWN & CO.,

McKean and Menden Hall,

PHILADELPHIA, - - PA.

United States Steel Lock Co.,

CLINTON, IOWA,

SOLE MAKERS

WARNER LOCKS.

LOCKS.

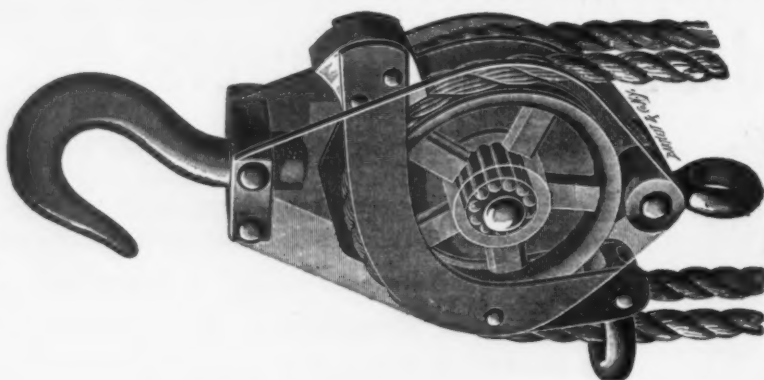
Cold Rolled Steel.
Accurate in Construction.
Unsurpassed in Quality.

HARDWARE.

Artistic in Design.
Elegant in Finish.
Moderate in Price.

LANE Tackle Blocks.

Automatic Lock.
Steel Case—galvanized.
Roller Bushed.
No Check Cord.



STANDARD BLOCK.

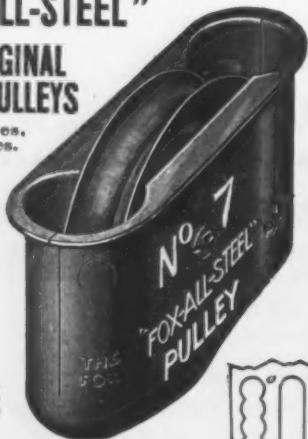
LANE BROTHERS CO.,
MANUFACTURERS,
Prospect and River Sts.,
POUGHKEEPSIE, N. Y.

"FOX-ALL-STEEL"

THE ORIGINAL
STEEL PULLEYS

Two Styles.
Two Sizes.

LIGHT
STRONG
NOISE-
LESS
DURABLE



3/4 in. Wheel, for EITHER a FOUR HOLE
OF STRAIGHT SIDE MACHINE MORTISE.
ADAPTED TO ANY ONE'S USE.

Write for our **SAMPLE PULLEYS FREE.**
Catalogue and **FOX MACHINE CO.,** 195 No. Front St.,
Grand Rapids, Mich.

Palmer's Common Sense Frame Pulley.



MANUFACTURED BY

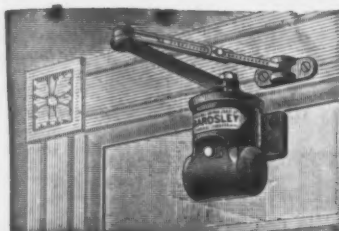
PALMER HARDWARE MFG. CO.,
TROY, N. Y.

**SILVER LAKE
SASH CORD**
Has been the standard for thirty years.

MANUFACTURED
BY THE
SILVER & LAKE CO.
BOSTON.

Every Hank Bears the Above Label.
SEND FOR SAMPLE.

THE "BARDSLEY" Oil Door Check and Spring



HAS new and improved features; is free
from packing friction; the checking
power can be released when the door is
near the closing point; more oil can be
added when needed without taking it
from the door and it can be readily taken
apart with the aid of a screw-driver when
repairs are necessary.

Size A,	price each,	\$3 50
" B,	" "	4 00
" C,	" "	5 00
" D,	" "	6 00
" E,	" "	7 00

LIBERAL DISCOUNTS TO THE TRADE.

JOS. BARDSLEY,

147 to 151 Baxter St., NEW YORK CITY.

Pullman Sash Balance Co.,

MAKERS
OF THE



"Pullman"
Hardware
Specialties

MAIN OFFICE AND WORKS,
Rochester, N. Y., U. S. A.

No Screws,
No Nails.

Use a ham-
mer and a
common
punch or
nail set.



Method of fastening the
GRAND RAPIDS ALL STEEL SASH PULLEYS.
Save Freight, Save Time, Save Money. Samples Free.
GRAND RAPIDS HARDWARE CO.,
21 Pearl St., Grand Rapids, Mich.

HALT!

HARDWARE DEALERS

CAN RECOMMEND

MORTON'S BRONZE AND STEEL CABLE SASH CHAINS

As the best substitute for sash cords
ever made. Some in daily use over
25 years. These chains are easily
applied to any window. Will run
equally as well on either round or
square groove pulleys.

MANUFACTURED BY

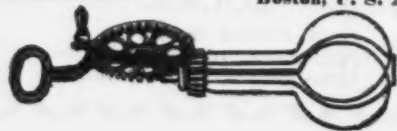
THOMAS MORTON.
65 Elizabeth Street,
NEW YORK.



**READ'S FLUSH FACE
STOP SCREWS** and
WASHERS make a per-
fectly smooth finish on
Window and Door Stops.
Also for Marble and Tile
Fasteners. Send for sam-
ple of our sash spring.

A. P. READ & CO.,
Manufacturers,
14 and 16 No. Canal St.,
Chicago, U. S. A.

EGG We make the largest line in the world. Send
for samples and prices. **STANDARD CO.**
BEATERS. 107 Haverhill St.,
Boston, U. S. A.



ESTABLISHED 1887
THE STORM MANUFACTURING CO
The Largest and Leading Makers of

Dumb-Waiters and Hand Elevators

NEW YORK OFFICE: FACTORY & MAIN OFFICE:
113 CHAMBERS ST. NEWARK, N. J.

BIGELOW WIRE FLY KILLER.

The original and up-to-date
Fly Killer on the market. It
has no equal. Flies cannot
escape it. Will not crush,
soil or mar the most delicate
wall paper or ceiling.

A Quick Seller. Good Profits.
Trade sample on application.
J. P. BIGELOW, Mfr.,
Worcester, Mass.

Patented Jan. 8, 1896.

Headquarters for Cutlery

American, English, German, French, Swedish.

Pocket Knives, Table Cutlery,
Razors, Carvers,
Scissors, Butchers' Knives,
Shears, Painters' Knives.

KEY RINGS, CORKSCREWS, TWEEZERS, Etc.

SOLE AGENTS for R. MURPHY'S Oyster Knives, Paper Hangers' Knives, Etc.

NEW ENGLAND AGENTS for EMPIRE KNIFE CO.'S Pocket Knives.

DAME, STODDARD & COMPANY,
BOSTON, MASS.

STEEL FOR PRESSED, STAMPED, DRAWN AND PLATED WORK.

ESTABLISHED 1877. INCORPORATED 1884

The WILMOT & HOBBS Mfg. Co.

MANUFACTURERS & EXPORTERS OF
BEST SOFT, EXTRA SOFT & SPRING, BESSEMER
& OPEN HEARTH, HOT ROLLED, ANNEALED & PICKLED, ALSO
BRIGHT COLD ROLLED "SWEDON" STEEL.
UNEXCELLED FOR PRESSED, STAMPED,
DRAWN & PLATED WORK.

NICKEL PLATED
RINGS FOR STOVES
STOVE EDGE TRIMMINGS
NICKEL PLATED STEEL
FOR STOVE RAILS, TOWER RIGGS & C.

UNMOUNTED
CONC
WILMOT'S PATENT
CRUSHING
TEST

WILMOT'S
PATENT
"CLINCHER" CYCLE TUBING
STRONGER THAN THE SEAMLESS.

WE MAKE A SPECIALTY OF
WILMOT'S PATENT SPRING STEEL BEDSTEAD TUBING
OF SUPERIOR FINISH, LIGHTNESS & STRENGTH.
ENGINEERS' & STEAMBOAT SETS, "COPPERIZED" ALSO NICKEL,
BRASS-PLATED & JAPANESE.

BRANCH OFFICE:
POSTAL TELEGRAPH BLDG., NEW YORK.

MAIN OFFICES & WORKS:
BRIDGEPORT, CONN., U.S.A.

"COLD ROLLED STRIP STEEL."

Patent "Clincher" Fifty Carbon "Swedon" Spring Steel Cycle Tubing.



Take
Your
Choice

You "Get Your Money's Worth,"

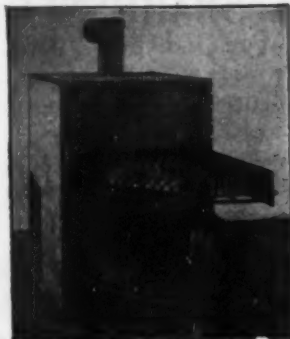
Peters Shells

Ideal. New Victor.
Referee. League.

The Peters Cartridge Co.,
CINCINNATI, O.

Eastern Branch: T. H. Keller, Mgr., 80
Chambers St., New York.
Hibbard, Spencer, Bartlett & Co
Chicago.

Millett's Patent



PORTABLE CORE OVEN

All complete and ready to put the fire in.

No one who makes small cores
can afford to be without it.

DOUBLE DOORS.

One closing the oven when the other is open.

Saves Fuel, Saves Time.

Send for Circular.

MILLETT CORE OVEN CO., Brightwood, Mass.

The ovens can be seen in the sample rooms of the S. Obermayer
Co., either in Cincinnati or Chicago, and in the show rooms of J. W.
Faxon & Co., Philadelphia. England Agents, J. W. Jackman & Co., 29 Victoria St., London S. W.

H. & R. ARMS COMPANY'S



HAMMERLESS
REVOLVER.

32 and 38
Calibers

Independent
Cylinder Stop.

Write for Catalogue.

HARRINGTON & RICHARDSON ARMS CO.,
Worcester, Mass., U. S. A.
Park Ave. and Chandler St.

SAFETY FUSE.

ENSIGN, BICKFORD & CO.,
Simsbury, Connecticut,
U. S. A.

MARLIN



IN these days of smokeless powders and high pressures why take chances on filling your face with powder, losing your eyesight and possibly your life by using a repeater that opens on top and ejects into your face, when you can avoid the possibility by buying a MARLIN? The Solid Top Frame and Side Ejecting principle is the most important improvement made in repeating arms for many years. Complete illustrated catalog for 3 stamps.

THE MARLIN FIRE ARMS CO.
NEW HAVEN, CONN.

THE GONG BELL MFG. CO.,

E. HAMPTON, CONN., U. S. A.

ABBE'S and YANKEE

PATENT GONG DOOR BELLS.

Globe and Silver Chime Bells Table Call Bells
Bicycle Bells, Signal Trip Gongs, Automobile Bells, etc.
ESTABLISHED 1864
Send for Catalogue and Prices.

MANUFACTURERS OF



Bells

of all descriptions;
also BICYCLE
SPECIALTIES.

Established in 1838.

AUTOMOBILE BELL.

Bevin Bros. Mfg. Co.,

EAST HAMPTON, CONN.



Sterling Bells.

CONTINUOUS
RINGING

With
Rotary
Movement
and Non-
Revolving
Gongs.
Best on
Earth.

Send for Catalogue
"A."

N. N. HILL BRASS CO., EAST HAMPTON
CONN.

IF YOU SHOOT A RIFLE.



Pistol or Shotgun, you'll make a Bull's
Eye by sending three 2c. stamps for the
Ideal Hand-Book, 136 pages FREE.
The latest Encyclopedia of Arms, Pow-
ders, Shot and Bullets. Mention Iron
Age. Address IDEAL MFG. CO., New
Haven, Conn., U. S. A.

CLASPS THE CLOTHES ON THE LINE.
U. S. Spring Clothes Pin will not damage fabrics



United States
Clothes Pin Co., MONTPELIER, VT., U. S. A.

TRAP SHOOTING



Remington HAMMERLESS GUNS

A CATALOGUE WILL BE
SENT ON APPLICATION



Remington Arms Co. ILION NEW YORK

Agencies
313 Broadway - New York - 425 Market St. - San Francisco

141 B FOUR JOINTED

CLEANING ROD,

with revolving cocobolo handle, having slotted and jagged tip which will take brass wire and bristle brushes. Packed in canvas bag; the most compact and effective rod on the market. All calibres. Sample sent on receipt of 75c. in postage.

The BRIDGEPORT GUN IMPLEMENT CO., 313 BROADWAY,
NEW YORK CITY.

We work all kinds of Sheet Metal in all
kinds of shapes.

METAL STAMPINGS.

Send Sample or Drawings
for Price.

DAVIS & BUXTON
STAMPING CO.,

3 Cypress St.,
Worcester, Mass

The Markham Air Rifles



The "PRINCE" is
our 1900 model. Re-
tail price \$1.00.

Penetrates 1/4 in. pine.

The "KING" single shot, the
"KING" repeater, the "PRINCE"
single shot, the "PRINCE" re-
peater, and the "CHICAGO"
breach loader, air rifles, abso-
lutely the greatest article of
amusement known. Shoots BB
drop shot. For sale by all jobbers.
Send for catalogue.

THE MARKHAM AIR RIFLE CO., Plymouth, Mich., U. S. A.

The FILE'M QUICK

is the Simplest and Most Popular

SKATE SHARPENER

ON THE MARKET.

Holders are made of Steel—

GUN METAL FINISH.

FILES HAVE FOUR GOOD SIDES.]

Attractively Displayed.

Quick Seller.

Large Profit.

ORDER NOW.—The boys can't wait.

THE OSBORN MANUF'G CO.,

Cleveland, O.



Display Card 7 1/2 x 7 inches.

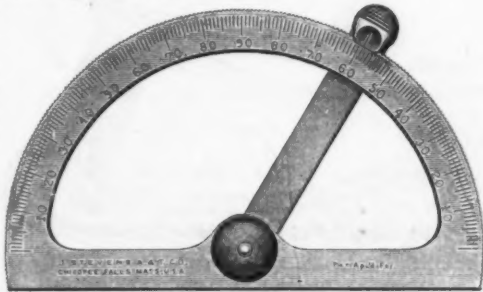
STEVENS TOOLS:::::

— Make a valuable line for those interested in such goods.

Guaranteed—By a company of 35 years' reputation.

Fine sellers—Liberally advertised throughout the country.

Sold to the trade—We desire to have our goods carried and represented by the trade, and refer all inquiries to them.



THIS IS OUR ANGLE INDICATOR No. 151.

PRICE ONLY \$1.00.

It is **accurate**—no guess work about it.

It is **solid**—not flimsy or a makeshift, but a real tool for every day use, under all conditions, wherever you need angles.

Send for our complete Catalogue of Tools.

We have a business proposition for the trade.

NEW YORK OFFICE:
318 BROADWAY.

J. STEVENS ARMS & TOOL CO., P. O. Box 47, Chicopee Falls, Mass.

Billings' Patent Cutting-off Tool.



DROP FORGED, WITH BEST TOOL STEEL BLADES.

Machinists' Tools, and Drop Forgings of every description and for all purposes in Iron, Steel, Copper and Bronze.

Made by

THE BILLINGS & SPENCER CO., Hartford, Conn., U. S. A.

London Office, No. 8 Long Lane, London, E. C., England.

Established 1877.

SUPERIOR UNFINISHED

STEEL GONGS.

ALSO BRIGHT COLD ROLLED STRIPS

For All Purposes.

GEORGE JOHNSON, Catasauqua, Pa.



MALLEABLE IRON PLATE.

WIRE

Hammock and Clothes-

Line

HOOK.

Send for Sample and Circular.

E. H. WILSON & CO.,
Boston (Allston), - Mass.

HIGH CLASS

DROP FORGINGS.

STRIEBY & FOOTE CO.,

NEWARK, N. J.

Bicycle,
House,
Hand,

BELLS

Trip and
Rotary
Door.



Send for
Catalogue of

Full Line.

STARR BROS. BELL CO.,
Easthampton, Conn., U. S. A.



IMPROVED.

"NEVER-BREAK." Best Finished Goods Made.
SOMETHING NEW. WE HAVE IT.

TRADE
MARKS
ALLOWED.

SKATES FOR CHILDREN.

PATENTS
APPLIED
FOR.

WRITE TO US FOR PRICES, ETC.

THE AVERY STAMPING CO., Cleveland, Ohio, U. S. A.

J. C. McCARTY & CO., 10 Warren St., New York Representatives.

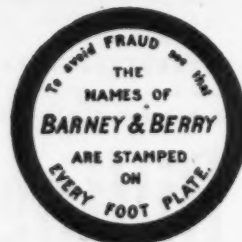
Barney & Berry's Skates.

Carried by all Leading Jobbers.



Catalog
Free

All Styles and Grades
of
Standard Skates.



NEW YORK OFFICE, 114 Chambers St.
PHILADELPHIA OFFICE, 412 Commerce St.
BOSTON OFFICE, 50 Pearl St.

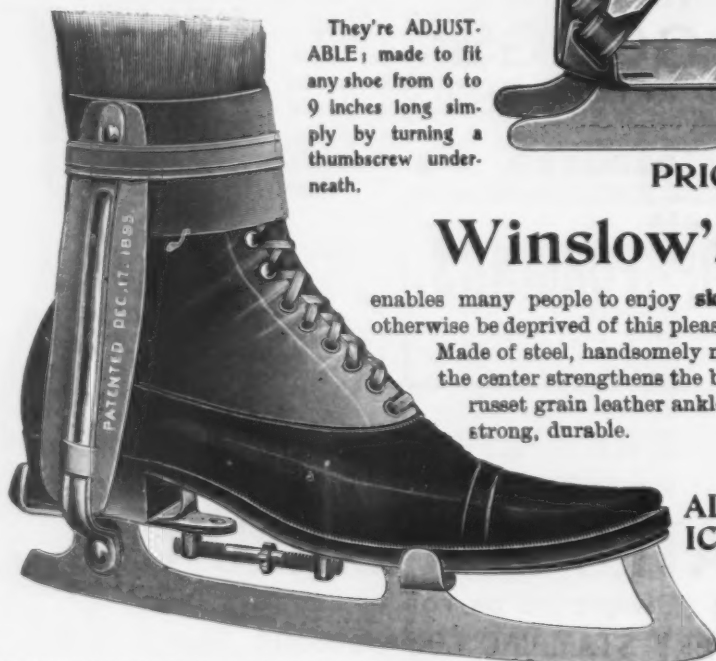
BARNEY & BERRY, Factory, Springfield, Mass.

In EVERY LAND where water freezes the BARNEY & BERRY SKATES are known.

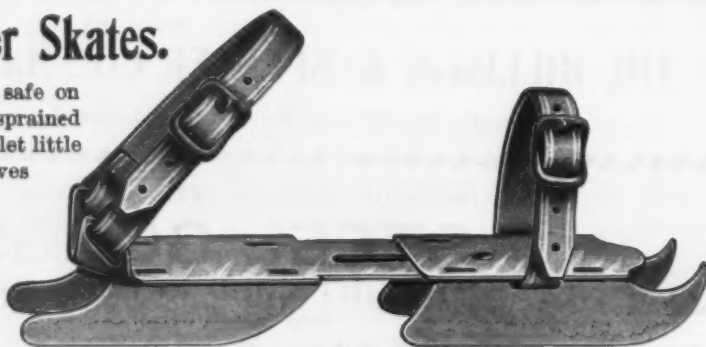
WINSLOW SKATES

Winslow's Double-Runner Skates.

Made specially for children. A child is as safe on these skates as on the ground. No bumps, no sprained ankles. Straps all on ready for use. Parents, let little folks have **Double Runners** and enjoy themselves



They're **ADJUST-ABLE**, made to fit any shoe from 6 to 9 inches long simply by turning a thumbscrew underneath.



PRICE 50c. per pair.

Winslow's Ankle Brace

enables many people to enjoy **skating** who, by reason of **weak ankles**, would otherwise be deprived of this pleasure.

Made of steel, handsomely nickel plated. A rib running lengthwise through the center strengthens the brace without making it heavy. Trimmed with russet grain leather ankle band. Easily attached to any skate. Light, strong, durable.

75c. per pair.

ALL KINDS OF
ICE and ROLLER **SKATES.**

Send for Illustrated Catalogue.

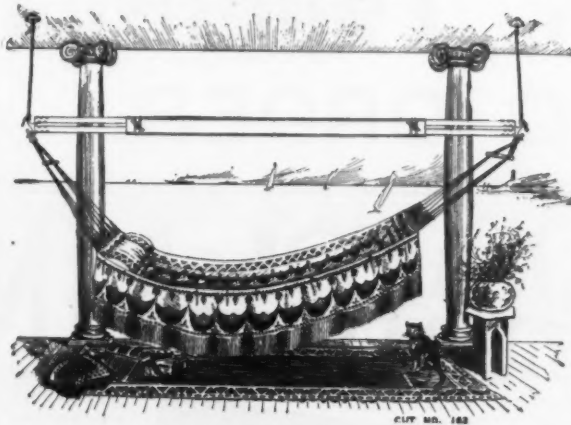
SAMUEL WINSLOW SKATE MFG. CO.,
WORCESTER, MASS.

PALMER'S PATENTED HAMMOCKS

PALMER'S ARAWANA.

(PATENTED)

As used with Trapeze Suspension.



The above Figure shows an Arawana slung from a Trapeze adjusted to its maximum extension as regards its suspension from the ceiling.

The Trapeze Suspension, as may be seen at a glance, is especially adapted to Veranda use, is adjustable to different sizes of Hammocks within its scope (from 6 ft. 3 in. to 11 ft.), and to giving different degrees of dip and heights of suspension. Every conceivable swinging motion is obtained without effort.

PALMER'S UTOPIA WITH SUPPORT.



CUT NO. 149.

The above Figure represents a reclining position in an Adjustable Hammock Support as used indoors. This support may be extended or contracted. The seat may be lowered or raised by the adjustment of the side cords where attached to the seat.

This support is adapted to Lawn, Veranda and Indoor use, and like the Trapeze Suspension, is adjustable to different sizes of Hammocks within its scope (from 6 ft. 3 in. to 11 ft.), and to giving different degrees of dip and height from floor.

For indoor summer or winter use, it will appeal to all who are inclined to ease and comfort, as it can be taken from a closet, set up, and Hammock hung ready for use in one minute.

PERFECTION—ARAWANA—UTOPIA.

Hammock Supports, Hammock Awnings, Hammock Mosquito Canopies, Trapeze Suspension Bars.

Largest Variety of Patterns, Colors and Accessories. Also Manufacturer of CANOPIES, MOSQUITO NETTINGS, CRINOLINE DRESS LINING, WINDOW SCREEN CLOTH, SCHOOL BAGS, etc., etc.

Send for our new Catalogue for 1901.

I. E. PALMER, Middletown, Conn., U. S. A.
NEW YORK OFFICE, 62 White St. Infringers are being Prosecuted.

WRIGHT SHOVEL COMPANY

Office and Shovel Plant,
Anderson, Ind.

Steel Mill,
Elwood, Ind.

EVERY KNOWN
VARIETY
..FOR..
EVERY PURPOSE.



SHOVELS,
SPADES,
SCOOPS,
DITCHING TOOLS.

Manager Eastern and EXPORT Office,

A. G. SHERMAN,

14 Warren St., N. Y.

For All Dealers.

Hundreds of Hardwaremen have found The American Hardware Store a trade winner and an almost indispensable adjunct to the store. If it will prove half as valuable to you, the price is really a nominal consideration.

450 Pages.

300 Illustrations.

THREE DOLLARS.

DAVID WILLIAMS COMPANY, Publishers, - - 232-238 William St., N. Y.

BURDEN'S HORSE SHOES.

"Burden Best"

Iron

Boiler Rivets.

The Burden Iron Co.

TROY, N. Y.

PHOENIX HORSE SHOES.

PHOENIX HORSE SHOE CO.,

Rolling Mills and Factories,

Poughkeepsie, N. Y.

Joliet, Ill.

P. F. BURKE,
Manufacture of Polished Steel (Blunt and Sharp)



FOUNDRY LAMP.



Makers of Fine Light Grey Iron Castings.

The Scranton Forging Co.
Scranton, Pa.

DROP FORGINGS TO ORDER.

CHAMPLAIN

ALL SIZES.
ALL PATTERNS.
ALL WARRANTED.
SOLD EVERYWHERE.

J. C. McCarty & Co.
Agents.
NEW YORK.



Send for Price
and Illustrated List.

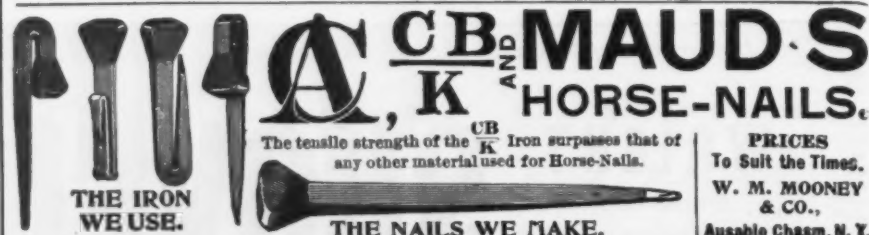
Manufactured by
**NATIONAL HORSE
NAIL CO.,**
VERGENNES,
VERMONT.

RHODE ISLAND PERKINS HORSE SHOE CO.,
MANUFACTURERS OF
HORSE AND MULE SHOES OF THE PERKINS PATTERN.

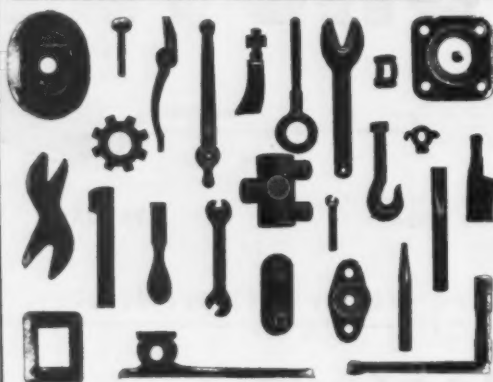
SPECIALTIES: X L Steel Shoes, Toe and Side Weight Shoes and
Goodenough Shoes.

Works at VALLEY FALLS, R. I.
F. W. CARPENTER, Pres.

Office, 112 Industrial Trust Building, PROVIDENCE, R. I.
C. H. PERKINS, Gen. Manager. R. W. COMSTOCK, Sec'y.
CHARLES R. STARK, Treas.



PRICES
To Suit the Times.
W. M. MOONEY
& CO.,
Ausable Chasm, N. Y.



DROP FORGINGS

TO ORDER.
Send us Drawings or Samples
for Estimates on your
Requirements.

The TRANSUE & WILLIAMS CO.
ALLIANCE OHIO

—MAKERS OF THE—
Original D. V. & Co. Seamless Cast Iron
Thimble Skeins.

All other makes are imitations.

Over 1,000,000 sets in use.



Your Orders are solicited.

W. B. MITCHELL, Agent Manufacturer, Office, 80 Michigan Avenue, Chicago, U. S. A.
Works at Grand Crossing Ill.



PARIS -- 1900.

Our Latest Trophy.

"WITHINGTON" FORKS, HOES, RAKES, Etc., Etc.,

ARE "WINNERS" EVERYWHERE;

In the Store, in the Garden, on
the Farm, and at all the
World's Great Competi-
tive Exhibits.

SEND FOR CATALOG OF 1900-1901.

**Withington & Cooley Mfg. Co., JACKSON,
MICH., U. S. A.**



Any
Side-
walk
Cleaners
Wanted?

Turf Nails, Nos. 1 to 5.



French Heads, will fill any shoe punched or creased.
Nos. 3 to 8.



Regular Heads, Nos. 5 to 14.



City Heads, for shallow creased shoes, Nos. 5 to 9.



Counter Heads or Frost Nails, Nos. 5 to 9.



PUTNAM NAILS.

Putnam Hot Forged and Hammer Pointed.
Neponset Hot Forged and Sharp Pointed.
Franklin Hot Forged and Sharp Pointed.

The Neponset is produced by the same method and of the same
material as the Putnam, with the exception that it is sharp pointed.

The Franklin Nail will be put up under private brands in
quantities not less than 80 boxes.

Trade correspondence solicited.

For terms and discounts address

PUTNAM NAIL CO., Boston, Mass.

Or { 235 Lake St., Chicago, Ill.
12-14 Drum St., San Francisco, Cal.

RICHARD ECCLES, Auburn, N. Y.,
MANUFACTURER OF

CARRIAGE AND BICYCLE FORGINGS.



Send for Our Catalogue.

MALLEABLE IRON

Axe Wedges,

Eagle Screw Clamps,
Mount Carmel Ox Shoes,
Storm Window Fasteners,
Malleable Iron Castings,
Carriage Mountings.

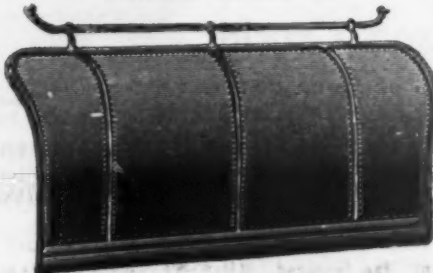
The WALTER W. WOODRUFF & SONS CO.,
Mount Carmel, Conn., U. S. A.



McKINNON DASH CO.,

MANUFACTURERS OF

Dashes,
Fenders,
Roll Up Straps,
Prop Block
Washers
and
Shaft Leathers.

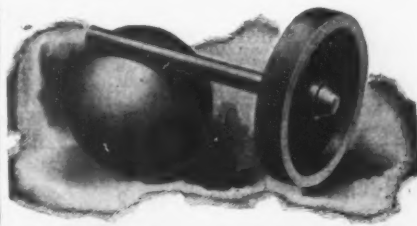


"V" PATTERN.

Largest Capacity
in the World.

Factories at
Buffalo, N. Y.,
Troy, O.
Cincinnati, O.,
Syracuse, N. Y.,
St. Catharines, Ont.

Cincinnati, O.

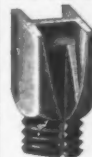


FORGINGS

of Every Description and
for All Purposes.

WYMAN & GORDON, WORCESTER, MASS.

HORSESHOE - H - CALKS (Neuss' Patent)

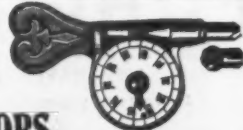


Always Sharp! No Slipping of the
Horse! No Injuries as caused by
other Studs! Great Saving of Horses
and Horseshoes.

Price List with Testimonials, Post Free.
Patentees and Sole Manufacturers.

LEONHARDT & CO.,
Berlin-Schoneberg, Germany.

WOODMAN'S SPEED INDICATORS.



For ascertaining correct speed of Dynamos,
Steam Engines, Shafting, Floor Machines, etc.
Supplied with Rubber Tires, Split Caps and
Plain Caps, etc. Send for catalogue and prices.

R. WOODMAN MFG. & SUPPLY CO.,
Boston, Mass., U. S. A.



Drag Scrapers, Wheel Scrapers

For years we have been producing the highest grade of implements for Contractors' use, including many styles of Wheelbarrows, until now we are the largest makers of such in the world. Ask for our Catalogues descriptive of same.

The Kilbourne & Jacobs Mfg. Co.,
Columbus, O., U. S. A.

The American Hay Knife

SICKLE EDGE.



MANUFACTURED ONLY BY
THE NEY MANUFACTURING CO.,
CANTON, OHIO.

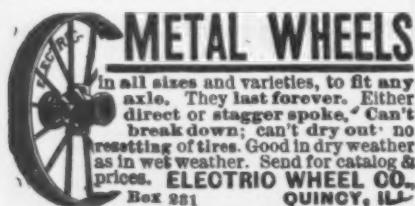
FORGINGS

Carriage, Bicycle and Special.



Correspondence Solicited.

E. D. CLAPP MFG. CO.,
AUBURN, N. Y.



In all sizes and varieties, to fit any axle. They last forever. Either direct or stagger spoke. Can't break down; can't dry out; no resetting of tires. Good in dry weather as in wet weather. Send for catalog & prices. ELECTRIC WHEEL CO.,
Box 251
QUINCY, ILL.

Garden Plow or Hand Cultivator.

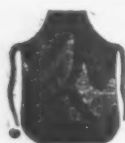
A profitable tool to handle.



THE H. P. DEUSCHER CO.,
Hamilton, Ohio, Manufacturer.

DROP FORGINGS

THE M. SEWARD & SON CO.,
NEW HAVEN, CONN.
Estimates promptly furnished.



BLACKSMITHS'
LEATHER APRONS.
Largest Mfrs. in U. S.
Split Leather, Sheep, Goat, Hog
Cow, Calf and Horse Hide.
THE HULL BROTHERS CO.,
Danbury, Conn.

Cronk's Champion Wrought Steel Garden Rake.



Strongest and most durable Rake in the market. Write for price. Send for catalogue of full line of Hardware Specialties.

CRONK HANGER CO., Elmira, N. Y.

CONTINENTAL TOOL CO.,

FRANKFORT, N. Y.

The Finest and best equipped Steel
Goods Plant in the World

Wheelbarrows, Drag and Wheel Scrapers and Trucks



SIDNEY STEEL SCRAPER CO.,

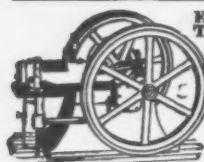
24 POPLAR STREET

SIDNEY, O.

Write for Prices and Cat.

BOOKS.

YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing DAVID WILLIAMS COMPANY, Publishers and Booksellers, 232-238 William St., N. Y.



WEBER GAS AND GASOLINE ENGINE CO.
P. O. Box 1114 V. KANSAS CITY, MO.
Chicago Office, 1551 Monadnock Block.

Every Weber Engine is Tested in the most thorough manner before it leaves our shops.—is required to carry its full load for four days, and is rigidly tested for its consumption of fuel. No engine that fails to fully meet these tests ever goes out of our shops. We could not afford to let it. Send for catalog.



OSGOOD
Popular Priced
High Grade
SCALES
Send for Catalogue and
Discount Sheet. Attractive
Store Manager Free!
OSGOOD SCALE CO. Binghamton,
N.Y.



WILL go further with the C. S. Co.
than with any other reliable firm
in buying useful articles, including
Furniture, Beds, Mattresses, Stoves,
Sewing Machines, Pianos, & Organs,
Watches, Bicycles, Safes, Blacksmiths'
Tools, Mills, Lathes, Gasoline & Steam
Engines, Plows, Scrapers, Carriages,
Harness, Saddles, Wire Fencing
and SCALES of all varieties.
The Premium Wagon or Stock
Scale, Steel Frames. Lists free.
Chicago Scale Co. CHICAGO, ILL.

THE HOLLOW GRIP HORSE SHOE



It
Cannot
Slip.

...IS THE...
**SAFEST, MOST SENSIBLE, DUR-
ABLE AND ECONOMICAL SHOE**

ever put upon the market. Supplied in
Drop Forge Steel and Malleable Iron.
Thirty-six sizes; for horses, mules and
ponies.

No calks to sharpen. Relief from jar
and strain. It is light, prevents inter-
ference

The proper shoe for a horse and is
SUPERIOR to all others. Endorsed by all
users. Send for illustrated booklet giv-
ing full description, etc., of shoe.

Special discounts to dealers.



It can be
put on
Cold.

THE HOLLOW GRIP HORSE SHOE CO., 1303 Chamber of Commerce Bldg.,
CHICAGO, ILL., "Dept. G."



"CAN'T HOOK IT OFF"

**10,000 DEALERS
WANTED**

To Sell our Barn Door Hangers,
Hay Carriers, Hay Slings, etc.

**THERE IS MONEY IN IT.
THE "LOUDEN GOODS"**

have no equal and are fast taking the place of
everything else. Don't waste time on some-

thing out of date, but secure the sale of the goods that **COMMAND THE "CREAM OF THE TRADE,"**
Address **LOUDEN MACHINERY CO.,** Box A, Fairfield, Iowa.



HAS NO
EQUAL.

PELOUZE SCALE & MFG CO.
CHICAGO
MANUFACTURERS OF
Scales
HOUSEHOLD
COUNTER
MARKET
CANDY
POSTAL
SCALE S
SPRING BALANCES
& ETC

THE
"BOSS"
is the best Land Roller
on Earth. Made for
either hand or horse.
WRITE FOR PRICES.
R. W. Whitehurst & Co.,
Norfolk, Va., U. S. A.



**VAN DORN'S Steel
Joist
Hanger**



HAS NO EQUAL

Send for Catalogue.

**THE VAN DORN
IRON WORKS CO.,
CLEVELAND,
OHIO.**

STRUCTURAL STEEL
AND ORNAMENTAL IRON WORKERS.

"CANFIELD"

Set Screw Protector.



It is made of specially prepared rubber,
and will last for years. Can be applied
by any workman, the elasticity of the
rubber being utilized to hold it in place
over the screw. Highly commended by
the Liability Companies and Factory In-
spectors.

Information and prices promptly fur-
nished.

H. O. CANFIELD,
Manufacturer Mechanical Rubber Goods.
BRIDGEPORT, CONN.

LIGHT CARS

—OF ALL KINDS
FOR MINING, LOGGING, PLANTATION
CONTRACTORS & RAILWAY USE.
SHEFFIELD CAR CO.
OAK ST., THREE RIVERS, N.J.

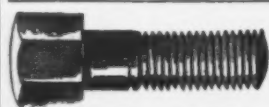


**Solid Steel Tray
WHEELBARROWS**

OF
ALL
KINDS.

Manufactured by
**The American Steel Scraper Co.,
SIDNEY, OHIO, U. S. A.**

Write for prices.



The ILLINOIS SCREW CO.,
20 SOUTH CANAL ST., CHICAGO.

Lawn Sprinklers

The Best on Earth

Are Our

**Cactus, Japanese, Park,
National, Pacific, and Imperial.**



JAPANESE No. 12
ADJUSTABLE.

also our 3/4 in. Special Coupling and
Spray Nozzle. Our general line of
Hose Pipe, Menders, etc., are equal to
the best made.

Send for our New Catalogue. It will
interest you for the Season 1901.

Pleuger & Henger Mfg. Co.,
ST. LOUIS, MO.

ALPHABETICAL LIST OF ADVERTISERS

- A**
- Acme Machinery Co. 61
 Acme Shear Co. 103
 Acme Steel & Malleable Iron Works. 38
 Adam, W. J. 8
 Adams Co. 67
 Adiance Machine Works. 79
 Affleck, Geo. E. 85
 Aiken, Henry. 41
 Ajax Mfg. Co. 59
 Alabama Consolidated Coal & Iron Co. 26
 Albany Foundry Co. 38
 Alexander Bros. 90
 Allen, E. R. 89
 Allentown Rolling Mills. 35
 Allis, E. P. Co. 45
 American Appraisal Co. 94
 American Blower Co. 71
 American Bridge Co. 15
 American Carburizing Co. 84
 American Gas Furnace Co. 65
 American Emery Wheel Wks. 58
 American Hardware Mfg. Co. 95
 American Iron & Steel Mfg. Co. 25
 American Mfg. Co. 64
 American Metal Co. 3
 American Nickeloid Co. 4
 American Pig Iron Storage Warrant Co. 28
 American Pulley Co. 54
 American Railway Supply Co. 95
 American Screw Co. 112
 American Shearer Mfg. Co. 97
 American Sheet Steel Co. 123
 American Steel Hoop Co. 22
 American Steel Scraper Co. 138
 American Steel & Wire Co. 10
 American Tin Plate Co. 23
 American Tool Chest Co. 103
 American Tool Works Co. 76
 Ames Sword Co. 47
 Anania Brass & Copper Co. 3
 Arcade File Works. 118
 Arcade Malleable Iron Co. 34
 Arcade Mfg. Co. 105
 Armstrong Bros. Tool Co. 65
 Armstrong Mfg. Co. 62
 Armstrong, R. S. & Bro. 89
 Asher, A. 88
 Ashton Valve Co. 48
 Asphalt Ready Mfg. Co. 9
 Athol Machine Co. 117
 Athol Pump Co. 122
 Atkins, E. C. & Co. 100
 Atlanta Junk Co. 90
 Atlantic Grindstone Co. 109
 Atlas Bolt & Screw Co. 44
 Atlas Mfg. Co. 147
 Atlas Pipe Wrench Co. 115
 Aultman Co. 51
 Automatic Machine Co. 74
 Avery Stamping Co. 94
- B**
- Babcock & Wilcox Co. 43
 Baeder, Adamson & Co. 98
 Baird, C. R. & Co. 82
 Baird, U. Machinery Co. 87
 Baker, Jas. H. Mfg. Co. 80
 Balfwill Pattern Wks. 94
 Ball Bearing Co. 59
 Bardsley, Jos. 124
 Barker & Chard Mch. Tool Co. 69
 Barnes, Wallace Co. 5
 Barnes, B. F. Co. 81
 Barnes, W. F. & John Co. 67
 Barnes Mfg. Co. 122
 Barnett, U. & H. Co. 119
 Barney & Berry. 132
 Barney & Reed Mfg. Co. 127
 Barnum, E. L. 9
 Barrett, W. L. 107
 Bateman Mfg. Co. 137
 Baum Mch. Tool Co. 77
 Bayley, Wm. & Sons Co. 76
 Bay State Stamping Co. 72
 Beaudry & Co. 69
 Becker & Brainard Milling Mch. Co. 73
 Becker Name Plate Co. 72
 Beiden Machine Co. 59
 Bell, Edwin & Co. 17
 Bemis & Call Hardware & Tool Co. 118
 Berger Bros. Co. 104
 Berhe, A. 8
 Bealy, C. H. & Co. 148
 Bessemer Coke Co. 39
 Best Mfg. Co. 46
 Bethlehem Fdry. & Mch. Co. 70
 Bethlehem Steel Co. 82
 Bevin Bros. Mfg. Co. 100
 Bickford Drill & Tool Co. 64
 Bicknell Hardware Co. 72
 Bicycle Step Ladder Co. 111
 Bigelow, J. F. 138
 Bignall & Keeler Mfg. Co. 63
 Billings & Spencer Co. 181
 Birmingham Iron Fdry. 84
 Bishop, Geo. H. & Co. 112
 Russell, E. & Co. 89
 Blackman & King. 5
 Blackwell, G. G. Sons & Co. 27
- C**
- Cabene & Co. 29
 Cahall Sales Dept. 129
 Caldwell Mfg. Co. 98
 California Wire Works. 53
 Canfield, H. O. 139
 Canton Steel Co. 80
 Cape Ann Tool Co. 37
 Capewell Horse Nail Co. 1
 Carborundum Co. 57
 Card, S. W. Mfg. Co. 64
 Carlin's Sons, Thomas Co. 68
 Carter & Hakes Machine Co. 71
 Cary Mfg. Co. 97
 Cary Spring Works. 5
 Cattaraugus Cutlery Co. 103
 Central Hardware Co. 110
 Chambers Bros. Co. 17
 Champion Blower & Forge Co. 67
 Champion Iron & Steel Co. 25
 Champion Tool Co. 117
 Chandler & Farquhar. 114
 Chapman, J. B. & Co. 71
 Chapman Valve Mfg. Co. 45
 Charter Gas Engine Co. 44
 Chatillon, John & Sons. 5
 Chattanooga Washing Mach. & Wringer Co. 124
 Cheney, S. & Son. 35
 Cherry Valley Iron Co. 27
 Chester Steel Casting Co. 91
 Chicago Drop Forge & Fdy. Co. 36
 Chicago Flexible Shaft Co. 65
 Chicago House Wrecking Co. 88
 Chicago, Milwaukee & St. Paul Ry. 91
 Chicago Scale Co. 133
 Chicago Screw Co. 19
 Chicago Spring Bush Co. 125
 Chicago Time Register Co. 105
 Chilcote-Evans Chain Co. 113
 Chisholm & Moore Mfg. Co. 148
 Chrome Steel Works. 83
 Church, Isaac. 19
 Church, S. H. 25
 Cincinnati Mach. Tool Co. 74
 Cincinnati Milling Mch. Co. 78
 Cincinnati Planer Co. 79
 Clapp, E. D. Mfg. Co. 138
 Clarendon Boiler Wks. 45
 Clark, John W. 8
 Clark & Corlies. 4
 Clark, Horrocks & Co. 130
 Clark & Parsons Co. 147
- D**
- Dallett, Thos. H. & Co. 74
 Dame, Stoddard & Co. 129
 Danielson Mch. & Tool Co. 83
 D'Amour & Littledale Mch. Co. 61
 Darby, Edw. & Sons. 12
 Dart, E. M. Mfg. Co. 44
 Davis, W. P. Machine Co. 56
 Davis & Buxton Stamping Co. 130
 Davol, John & Sons. 2
 Dawson, A. L. & Co. 87
 Dawson & Goodwin. 84
 Deane Mch. Wks. 59
 DeKalb Fence Co. 11
 Deming Co. 122
 Demorest Mfg. Co. 110
 Denman & Davis. 38
 Detrick & Harvey Machine Co. 68
 Deutscher, H. P. Co. 138
 Diamond Drill & Mch. Co. 83
 Diamond Machine Co. 58
 Diamond Tool & Nail Wks. 14
 Dickinson, T. L. 53
 Dieneit & Eisenhardt. 65
 Dillon-Grissold Wire Co. 11
 Dimmick, J. E. & Co. 26
 Diaston, Henry & Son. 99
 Divine Bros. Co. 57
 Dixon, Jos. Crucible Co. 30
 Doan, J. B. & Co. 85
 Dodge Machine Screw Co. 72
 Dodge Mfg. Co. 53
 Doebler Mfg. Co. 63
 Donaldson & Newton. 90
 Draper Machine Tool Co. 51
 Drouve, G. Co. 138
 Du Bois Iron Works. 40
 Dudgeon, Richard. 65
 Duff Patents Co. 41
 Dunbar Bros. 2
 Dunham Nut Co. 17
 Dupont Mfg. Co. 24
 Durant, W. N. 45
 Dwiggin Wire Fence Co. 8
- E**
- Eagle Anvil Works. 118
 Eastern Bridge & Structural Co. 20
 Eastern Forge Co. 35
 Eastern Machinery Co. 54
 Eccles, Richard. 135
 Eckstein, C. G. 53
 Eddy Electric Mfg. Co. 43
 Edson Mfg. Co. 122
 Elmer & Amend. 89
 Electric Controller & Supply Co. 56
 Electric Wheel Co. 186
 Ellis & Halfenbarger. 8
 Empire Pipe Bending & Supply Co. 6
 Energy Elevator Co. 119
- F**
- Fairbanks Co. 47
 Fairmount Machine Co. 51
 Farrel Foundry & Mch. Co. 63
 Fay, J. A. & Egan Co. 63
 Ferracute Mach. Co. 72
 Ferro Carbon Casting Co. 85
 Filer & Stowell Co. 45
 Finished Steel Co. 30
 Fish, H. C. Machine Works. 71
 Fitch, W. & E. T. Co. The. 147
 Flagg, Stanley G. & Co. 148
 Flint & Walling Mfg. Co. 122
 Folding Paper Box Co. 103
 Ford Bit Co. 109
 Forest City Foundry & Mfg. Co. 184
 Forest City Steel & Iron Co. 90
 Forter-Miller Engineering Co. 41
 Fox Machine Co. 123
 Frankford Steel Co. 26
 Frank-Kneeland Mach. Co. 58
 Franklin, H. H. Mfg. Co. 96
 Frick, H. C. Coke Co. 95
 Frost Wire Fence Co. 7
 Fulton Iron & Engine Works. 58
- G**
- Gardner Bros. 85
 Garland Chain Co. 14
 Garrison, A. Foundry Co. 83
 Garry Iron & Steel Roofing Co. 11
 Garvin Machine Co. 78
 Gem Mfg. Co. 97
 General Electric Co. 43
 General Supply Co. 51
 Geometric Drill Co. 62
 Gerlach, Peter & Co. 100
 Gilbert & Bennett Mfg. Co. 12
 Gilmour, J. 71
 Gleason Tool Co. 148
 Goepel, Paul. 7
 Gong Bell Mfg. Co. 130
 Goodell Co. 104
 Goodell-Pratt Co. 110
 Goodwin & Kints Co. 95
 Gould & Eberhardt. 63
 Gould's Mfg. Co. 49
 Graham, John H. & Co. 114
 Grand Crossing Tack Co. 14
 Grand Rapids Hardware Co. 128
 Gray, Robt. J. 85
 Green, A. H. 112
 Green, Thomas A. 89
 Greiner, F. 90
 Griffin Mfg. Co. 103
 Griswold Wire Co. 5
- H**
- Hagen & Reid. 124
 Haines Gauge Co. 26
 Hall, Thomas. 114
 Hall, Samuel, Sons. 16
 Hammer & Co. 115
 Hannan & Finton. 86
 Harrington, E. Son & Co. 52
 Harrington & Richardson. 5
 Arms Co. 129
 Harris, Samuel & Co. 113
 Harris Machinery Co. 83
 Harrisburg Fdry. & Mach. Wks. 87
 Harrison Safety Boiler Wks. 40
 Hart, R. A. 2
 Hartford Steam Boiler Insp. & Ins. Co. 42
 Hartigan, W. R. 105
 Hartman Mfg. Co. 8
 Harvey, Arthur C. Co. 81
 Haskell, Wm. H. Mfg. Co. 19
 Haven Elevator Co. 35
 Haws, W. H. Fire Brick Co. 25
 Hay, Budden Mfg. Co. 117
 Hazard Mfg. Co. 7
 Heald, L. S. & Son. 59
 Heat Transmission Co. 49
 Heinsbach, H. Sons. 153
 Heller Bros. Co. 117
 Heller Box Co. 120
 Henderson's A. L. Sons. 65
 Henderson Bros. 83
 Hendey Machine Co. 95
 Hendricks Bros. 2
 Hendry, A. B. Co. 50
 Hess, Snyder & Co. 3
 Heyl & Patterson. 96
 Hibbard, W. H. 73
 Hickman, Williams & Co. 27
- I**
- Hertz, T. & Son. 88
 Hill, Henry F. 83
 Hill, N. N. Brass Co. 180
 Hill, Clarke & Co. 66
 Hill Dryer Co. 147
 Hill Tool Co. 66
 Hillis & Jones Co. 70
 Hillman, J. H. & Son. 86
 Hiltner, H. A. Sons. 89
 Hobson, Houghton & Co. 28
 Hofer Mfg. Co. 72
 Hofeller, Theo. & Co. 97
 Hoffman, Geo. W. 102
 Hoggson & Pettis Mfg. Co. 62
 Hollands Mfg. Co. 119
 Hollinger Fence Co. 9
 Hollow Grip Horse Shoe Co. 188
 Horsburgh & Scott. 59
 Horton, E. & Son Co. 63
 Hough Cash Recorder Co. 105
 Houghton & Buxton Mfg. Co. 95
 Houston, C. B. & Co. 29
 Howard Iron Works. 118
 Howard & Morse. 7
 Howson & Howson. 7
 Hubbell, Harvey. 16
 Huber, S. V. & Co. 41
 Hull Bros. & Co. 136
 Humphries Mfg. Co. 122
 Hungerford, U. T. Brass & Copper Co. 3
 Hunt, C. W. Co. 51
 Hurbit Rogers Mach. Co. 68
- J**
- Jackson Flue Scraper Co. 47
 Janney, Steinmetz & Co. 7
 Jarecki Mfg. Co. 66
 Jefferson Iron Co. 85
 Jeffrey Mfg. Co. 51
 Jenckes, E. Mfg. Co. 5
 Jenkins Bros. 1
 Jenkins Iron & Tool Co. 104
 Jenkinson, R. C. & Co. 6
 Jennings, C. E. & Co. 102
 Jennings, Russell Mfg. Co. 103
 Jessop, Wm. & Sons. 28
 Johnson, Geo. 131
 Johnson, I. H. Jr. & Co. 70
 Johnson, Iver, Arms & Cycle Works. 147
 Johnson, Wm. C. & Sons Mch. Co. 67
 Jones, B. M. & Co. 29
 Jones, Jesse Paper Box Co. 130
 Jones & Dommeranas. 117
 Jones & Lamson Machine Co. 96
 Jones & Laughlin, Ltd. 25
- K**
- Keagy & Lear Machine Co. 65
 Keeley, Jerome & Co. 29
 Keen & Hagerty Mfg. Co. 121
 Kelley, B. F. & Son. 84
 Kennedy, Julian. 99
 Kennedy, L. E. & Co. 90
 Kennedy, Walter. 41
 Kennedy Valve Mfg. Co. 148
 Keystone Drop Forge Works. 85
 Keystone Mfg. Co. 114
 Kidd Bros. & Burgher Steel & Wire Co. 7
 Kidder, K. E. 74
 Kilborn & Bishop Co. 89
 Kilbourne & Jacobs Mfg. Co. 136
 Kilbourne Mfg. Co. 128
 Kilmer Wire Mfg. Co. 9
 Kimball, C. J. Co. 102
 Kimball Bros. & Sprague. 19
 King, J. M. & Co. 119
 Kokomo Fence Mch. Co. 8
 Konigswald, E. & Bro. 95
 Kuperie, Jno. C. 93
- L**
- La Belle Steel Co. 30
 Ladd, W. C. 102
 Lake Ivy Engineering Co. 44
 Lamont, David. 41
 Lands Tool Co. 60
 Lane Brothers Co. 128
 Lang Cutlery Works. 102
 Lanz, M. & Sons. 19

Published by DAVID WILLIAMS
Co., 232-233 William St., New
York. Printed by THE WIL-
LIAMS PRINTING Co., Gen-
eral Book, Commercial and
Newspaper Printers and Bind-
ers, 232-233 William St., New
York.

CLASSIFIED LIST OF ADVERTISERS.

Acetylene Burners

State Line Talc Co., Chattanooga, Tenn.

Agricultural Implements

Case, J. I., Revere, N. J.
 Continental Tool Co., Frankfort, N. Y.
 Deutscher, H. P. Co., Hamilton, O.
 Iowa Farming Tool Co., Ft. Madison, Ia.
 Withington & Cooley Mfg. Co., Jackson Mich.

Air Compressors

Baird, U. Machinery Co., Pittsburgh, Pa.
 Clayton Air Compressor Works, 26 Cortlandt St., New York.
 Ingersoll-Sergeant Drill Co., 26 Cortlandt St., N. Y.
 N. Y. Air Compressor Co., 130 Liberty St., N. Y.
 Norwalk Iron Works, S. Norwalk, Ct.
 Pedrick & Ayer Co., Philadelphia, Pa.
 Rand Drill Co., 128 Broadway, N. Y.
 Sedgwick-Fisher Co., Chicago, Ill.

Air Moving Machinery

Howard & Morse, 45 Fulton St., N. Y.

Air Rifles

Markham Air Rifle Co., Plymouth, Mich.

Alloys

Blackwell, G. G. Sons & Co., Ltd., Liverpool, England.

Aluminum

Janney, Stelmets & Co., Phila., Pa.

Pittsburgh Reduction Co., Pittsburgh.

Ammunition

Peters Cartridge Co., Cincinnati, O.

Union Metallic Cartridge Co., 313-315 Broadway, N. Y.

Ankle Braces

Winslow, Saml., Skate Mfg. Co., Worcester, Mass.

Annealing Boxes

Warren City Boiler Wks., Warren, O.

Anti-Friction Metals—See Babbitt Metal.**Anti-Rust.**

Hunter Chemical Co., Phila., Pa.

Anvils

Eagle Anvil Works, Trenton, N. J.

Hay-Budden Mfg. Co., Brooklyn, N. Y.

Anvil and Vise (Combination)

Fulton Iron & Eng. Works, Detroit, Mich.

Apple Parers

Goodell Co., Antrim, N. H.

Reading Hardware Co., Reading, Pa.

Appraisers

American Appraisal Co., Milwaukee.

Aprons, Leather

Hull Bros. & Co., Danbury, Conn.

Arbor Press

Seneca Falls Mfg. Co., Seneca Falls, N. Y.

Arc Lamps

General Electric Co., Schenectady, N. Y.

Auctioneers

Blissell E. & Co., N. Y.

Auger Bits

Ford Bit Co., Holyoke, Mass.

Jennings, Russell Mfg. Co., Deep River, Conn.

Jennings, C. E. Co., 101 Reade St., N. Y.

Mayhew, H. H. Co., Shelburne Falls, Mass.

Fugh, Joe T., Phila., Pa.

Snell Mfg. Co., Flakdale, Mass.

Automatic Machines

Automatic Mch. Co., Bridgeport, Conn.

Cross & Speirs Machine Co., Waterbury, Conn.

Manville, E. J. Mch. Co., Waterbury, Ct.

Nelson, A. H. Mch. Co., Bridgeport, Ct.

Park City Mfg. Co., Bridgeport, Conn.

Spencer Automatic Mch. Screw Co., Hartford, Conn.

Awning Hooks

Wheeling Hinge Co., Wheeling, W. Va.

Awning Rods

Garland Chain Co., Rankin, Pa.

Axe Wedges

Woodruff, W. W. & Sons, Mt. Carmel, Ct.

Babbitt Metal

Hiers, T. & Son, St. Louis, Mo.

Magnolia Metal Co., 263-267 West St., N. Y.

Markle Lead Works, St. Louis, Mo.

Reeves, Paul S., Philadelphia, Pa.

Shimer, H. M. & Co., Phila., Pa.

Shonberg, L., 173 Hudson St., N. Y.

Syracuse Smelting Wks., Syracuse, N. Y.

Bale Ties

Griswold Wire Co., Braddock, Pa.

Kilmer Wire Mfg. Co., Chicago, Ill.

Wilson, H. P. & H. F., 377 5th Ave., N. Y.

Ball Floats

Naugatuck Mfg. Co., Naugatuck, Conn.

Bank and Office Railing

Kelsey Wire Works Co., 65 Fulton St., N. Y.

Barb Wire and Fence

Dillon-Griswold Wire Co., Sterling, Ill.

Bar Iron

Allentown Rolling Mill, Allentown, Pa.

American Iron & Steel Mfg. Co., Lebanon, Pa.

American Steel Hoop Co., Battery Park Building, N. Y.

Burden Iron Co., Troy, N. Y.

Champion Iron & Steel Co., Muskegon, Mich.

Consolidated Iron & Steel Co., Bristol, Pa.

Lockhart Iron & Steel Co., Pittsburgh, Pa.

Loran Iron & Steel Co., Burnham, Pa.

National Steel Co., Bridgeport, O.

Republiron & Steel Co., Chicago, Ill.

Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.

Virginia Iron, Coal & Coke Co., Bristol, Va.—Tenn.

Beams

Hall Beaming Co., Boston, Mass.

Beet Topping Knives

Whitehead, E. C. & Co., Indianapolis, Ind.

Bellows

Scott, Geo. M., Chicago, Ill.

Bells and Gongs

Bevin Bros. Mfg. Co., East Hampton, Ct.
 Gong Bell Mfg. Co., E. Hampton, Ct.
 Hill, N. N. Brass Co., E. Hampton, Ct.
 Johnson, Geo., Catsaugus, N. Y.
 Mossberg, Frank Co., Attleboro Mass.
 Starr Bros. Bell Co., Easthampton, Ct.

Belt Dressing

Dixon, Jos., Crucible Co., Jersey City.

Engineers Belt Dressing Co., Cleveland

Belt Hooks

Bristol Co., Waterbury, Conn.

Talcott, W. O. Providence, R. I.

Belt Studs

Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.

Beltling

Alexander Bros., 412 N. 3d, Phila., Pa.

Ames Sword Co., Chicopee, Mass.

Boston Belting Co., Boston, Mass.

Machinist's Supply Co., Rochester, N. Y.

Main Belting Co., Phila., Pa.

Peerless Rubber Mfg. Co., 16 Warren St., New York.

Shultz Belting Co., St. Louis, Mo.

Beltling Chain

Fuhl Malleable Co., Detroit, Mich.

Jeffrey Mfg. Columbus, O.

Link-Belt Engineering Co., Phila., Pa.

Bending Rells

Baker, Jas. H. Mfg. Co., Pittsburgh, Pa.

Hills & Jones Co., Wilmington, Del.

New Doty Mfg. Co., Janesville, Wis.

Niles Tool Works Co., 126-128 Liberty St., N. Y.

Bicycles

Johnson, Iver, Arms & Cycle Works, Fitchburg, Mass.

Remington Arms Co., Ill., N. Y.

Bicycle Bells—See Bells and Gongs.**Bicycle Chains**

Bridgeport Chain Co., Bridgeport, Ct.

Bicycle Lamps

Bridgeport Brass Co., Bridgeport, Conn.

Plume & Atwood Mfg. Co., 29 Murray St., New York

Bicycle Machinery

Bliss, E. W. Co., Brooklyn, N. Y.

Draper Mch. Tool Co., Worcester, Mass.

Garvin Mach. Co., Spring and Varick Sts., New York

Pratt & Whitney Co., Hartford, Conn.

Bicycle Parts

Davis & Buxton Stamping Co., Worcester, Mass.

Pittsburgh Screw & Bolt Co., Pittsburgh, Pa.

Springfield Machine Screw Co., Springfield, Mass.

Standard Tool Co., Cleveland, O.

Bicycle Sandries

Bevin Bros. Mfg. Co., E. Hampton, Mass.

Bridgeport Gun Implement Co., 313-315 Broadway, N. Y.

Hill, N. N. Brass Co., E. Hampton, Ct.

Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Smith & Egge Mfg. Co., Bridgeport, Ct.

Supply Hdw. Co., Phila., Pa.

Bicycle Wrenches

Star Mfg. Co., Carpentersville, Ill.

Binder Twine

American Mfg. Co., 65 Wall St., N. Y.

Bird Cages

Hendrix, Andrew B. Co., New Haven, Conn.

Bits

Conn. Valley Mfg. Co., Centerbrook, Ct.

Norton Mfg. Co., Chester, Conn.

Bit Braces

Mason & Parker, Winchendon, Mass.

Black Plate

American Tin Plate Co., N. Y.

Champion Iron & Steel Co., Muskegon, Mich.

Blind Forges

Miner & Peck Mfg. Co., New Haven, Ct.

Blocks, Tackle

Boston & Lockport Block Co., Boston.

Fulton Iron & Eng. Wks., Detroit, Mich.

Lane Bros. Co., Poughkeepsie, N. Y.

Blowers

American Blower Co., Detroit, Mich.

Asher, A., 109 Liberty St., N. Y.

Bavley, Wm. & Sons Co., Milwaukee, Wis.

Boston Blower Co., Hyde Park, Mass.

Buffalo Forge Co., Buffalo, N. Y.

Champion Blower & Forge Co., Lancaster, Pa.

Cornell, J. B. & J. M., 26th St. and 11th Ave., New York City.

Exeter Machine Wks., Boston, Mass.

N. Y. Blower Co., Bucyrus, O.

Papworth, H. M., 109 Liberty St., N. Y.

Sturtevant, B. F. Co., Boston, Mass.

Wilbraham Baker Blower Co., Phila., Pa.

Boat Hardware

Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.

Boiler Makers' Machinery

Prentice Bros., Worcester, Mass.

Boiler Plates

Lukens Iron & Steel Co., Coatesville, Pa.

Seidel & Hastings Co., Wilmington, Del.

Boiler Tubes

Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.

Metunes, O. E. & Co., Phila., Pa.

National Tube Co., Pittsburgh, Pa.

Boiler Tubes, Brass

Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.

Boilers, Steam

Babcock & Wilcox Co., 30 Cortlandt St.

Cahall Sales Dept., Pittsburgh, Pa.

Harrison Safety Boiler Wks., Phila., Pa.

Pollock, W. B. Co., Youngstown, O.

Wetherill, Robt. & Co., Chester, Pa.

Whitehead, W. W., Davenport, Iowa.

Wood, Jno. Mfg. Co., Conshohocken, Pa.

Bolt Cutters

Chambers Bros., Philadelphia, Pa.
 Sellers, Wm. & Co., Inc., Phila., Pa.

Bolt and Nut Machinery

Acme Machinery Co., Cleveland, Ohio.
 Ajax Mfg. Co., Cleveland, Ohio.
 Detrick & Harvey Mch. Co., Baltimore, Md.
 Howard Iron Works, Buffalo, N. Y.
 National Machinery Co., Tiffin, Ohio.

Bolts

American Iron & Steel Mfg. Co., Lebanon, Pa.
 American Screw Co., Providence, R. I.
 Blake & Johnson, Waterbury, Conn.
 Dunham Nut Co., Unionville, Conn.
 Franklin-Moore Co., Winsted, Conn.
 Hall's Sam'l Sons, 229 W. 10th St., N. Y.
 Harris, Saml. & Co., Chicago, Ill.
 Haskell, Wm. H. Mfg. Co., Pawtucket, R. I.
 Ladd, W. C., Bristol, Conn.
 McCloud, Crane & Minter Co., Worcester, Mass.
 National Elastic Nut Co., Milwaukee, Wis.

Pittsburgh Screw & Bolt Co., Pittsburgh, Pa.
 Port Chester Bolt & Nut Co., Port Chester, N. Y.
 Rhode Island Tool Co., Providence, R. I.
 Rockford Bolt Works, Rockford, Ill.
 Russell, Burdall & Ward, Port Chester, N. Y.
 Shelton Co., Birmingham, Conn.

Bolts

Williams, David Company, 232-233 William Street, N. Y.

Boring and Turning Mills

Sellers, Wm. & Co., Inc., Phila., Pa.

Box Fixtures

Cary Mfg. Co., 19-21 Roosevelt St., N. Y.

Box Hasps and Hinges

Cary Mfg. Co., 19-21 Roosevelt St., N. Y.

Box Straps and Corners

Cary Mfg. Co., 19-21 Roosevelt St., N. Y.

Boxes, Hdw. Shelf, &c.

Green, A. H. & Co., 22 Park Place, N. Y.

Jones, Jesse, Paper Box Co., Phila., Pa.

Moore, C. P., Ravenswood, W. Va.

Brackets, Shelf

Atlas Mfg. Co., New Haven, Conn.

Griffin Mfg. Co., Allegheny, Pa.

Brass and Copper

Ansonia Brass & Copper Co., 99 John St., N. Y.

Bridgeport Brass Co., Bridgeport, Ct.

Davol, John & Sons, 100 John, N. Y.

Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Plume & Atwood Mfg. Co., 29 Murray St., N. Y.

Randolph-Clowes Co., Waterbury, Conn.

Rutter, A. T., 256 Broadway, N. Y.

Seaville Mfg. Co., Waterbury, Conn.

Shimer, H. M. & Co., Phila., Pa.

Waterbury Brass Co., 60 Centre St., N. Y.

Brass and Copper Rods

Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Brass and Copper Wire

Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Brass Butt Hinges

Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Tiebout, W. J. & J., 118 Chambers

Brass Pounders

Best Mfg. Co., Pittsburgh, Pa.

Cramp, Wm. & Sons S. & E. B. Co., Philadelphia, Pa.

Reeves, Paul S., Philadelphia, Pa.

Ryan, J. J. & Co., Chicago, Ill.

Brass Steeds

Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Brass and Iron Jack Chains

Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Bridge Builders

American Bridge Co., 100 B'way, N. Y.

Boston Bridge Works, Boston, Mass.

Eastern Bridge & Structural Co., Worcester, Mass.

Illinois Steel Co., Chicago, Ill.

New England Structural Co., Boston.

Scaife, Wm. B. & Sons, Pittsburgh.

Bronze Ingots

Syracuse Smelting Wks., Syracuse, N. Y.

Bronze, Manganese

Cramp, Wm. & Sons S. & E. B. Co., Philadelphia, Pa.

Bronze, Tobin

Ansonia Bronze & Copper Co., 99 John St., N. Y.

Brooms and Brushes

Osborn Mfg. Co., Cleveland, O.

Cements, Iron

Smooth On Mfg. Co., Jersey City, N. J.

Chairs

Bradlee & Co., Philadelphia.
Bridgeport Chain Co., Bridgeport, Ct.
Chillicothe-Evans Chain Co., Allegheny, Pa.
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.
Jenkins Iron & Tool Co., Howard, Pa.
Link-Belt Engineering Co., Phila., Pa.
McKay Jas. & Co., Pittsburgh, Pa.
Onelda Community, Ltd., Niagara Falls Standard Chain Co., Pittsburgh, Pa.

Chain Plants

Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

Chemicals

Kimber & Amend, New York.

Cherry Stoppers

Enterprise Mfg. Co., Philadelphia Pa.
Goodell Co., Antrim, N. H.

Chisels

Buck Bros., Millbury, Mass.
Buck, Chas., Millbury, Mass.
Jennings, C. E. Co., 101 Reade St., N. Y.
White, L. & I. J. Co., Buffalo, N. Y.

Christmas Tree Holders

Logan & Strobbridge Iron Co., New Brighton, Pa.
North Bros. Mfg. Co., Philadelphia, Pa.

Chucks

Cushman Chuck Co., Hartford, Conn.
Doebler Mfg. Co., Middletown, Conn.
Goodell Pratt Co., Greenfield, Mass.
Hoggson & Pettis Mfg. Co., New Haven.
Holland Mfg. Co., Erie, Pa.
Horton, E. & Son Co., Windsor Locks, Ct.
Ideal Machine Works, Hartford, Conn.
Pratt Chuck Co., Frankfort, N. Y.
Skinner Chuck Co., New Britain, Conn.
Standard Tool Co., Cleveland, O.
Union Mfg. Co., 108 Chambers, N. Y.
Whitson, D. E. Mach. Co., New London, Conn.

Circular Sawing Machines

Kidder, R. E., Worcester, Mass.

Clamps

Bealey, C. H. & Co., Chicago, Ill.
Hall, Thos., Brooklyn, N. Y.
Hammer & Co., Branford, Conn.

Cleaning Rods

Bridgeport Gun Implement Co., 515-515 Broadway, N. Y.

Clipping Machines

Amer. Shearer Mfg. Co., Nashua, N. H.
Chicago Flexible Shaft Co., Chicago, Ill.
McCoy, Jos. F. Co., 26 Warren St., N. Y.
Wiebusch & Hilger, Ltd., 9-15 Murray St., N. Y.

Clothes Dryers

Hill Dryer Co., Worcester, Mass.

Clothes Line Hook

Wilson, E. H. & Co., Allston, Mass.

Clothes Pins

U. S. Clothes Pin Co., Montpelier, Vt.

Coal

Alabama Consolidated Coal & Iron Co., Birmingham, Ala.
Sloss Sheffield Steel & Iron Co., Birmingham, Ala.
Washington Coal & Coke Co., Dawson, Pa.
Wister, Francis, Philadelphia, Pa.

Coal Picks

Jenkins Iron & Tool Co., Howard, Pa.

Conster Brakes

Graham, John H. & Co., 113 Chambers St., N. Y.

Coffee and Spice Mills

Arade Mfg. Co., Freeport, Ill.
Parker, Chas. Co., Meriden, Conn.

Coke

Alabama Consolidated Coal & Iron Co., Birmingham, Ala.
Bessemer Coke Co., Pittsburgh, Pa.
Cherry Valley Iron Tool Co., Phila., Pa.
Dunmick, J. K. & Co., Phila., Pa.
Frick, H. C. Coke Co., Pittsburgh, Pa.
Houston, C. B. & Co., Philadelphia, Pa.
Sloss Sheffield Steel & Iron Co., Birmingham, Ala.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Virginia Iron, Coal & Coke Co., Bristol, Va.-Tenn.
Washington Coal & Coke Co., Dawson, Pa.
Wister, Francis, Philadelphia, Pa.

Compressed Air Machinery

Phila. Pneumatic Tool Co., Phila., Pa.

Condenser Tubes, Brass or Copper

Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Conductor Pipe

Berger Bros. Co., Philadelphia, Pa.

Conveying Machinery

Aultman Co., Canton, Ohio.
Brown Hoisting Machinery Co., Inc., Cleveland, Ohio.
California Wire Works, San Francisco, Du Bois Iron Works, Du Bois, Pa.
Hunt, C. W. Co., W. New Brighton, N. Y.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Engineering Co., Phila., Pa.

Cooking Utensils

Cleveland Stamping & Tool Co., Cleveland, O.

Coping Saw

Jones & Dommersnas, Chicago, Ill.

Copper

Hendricks Bros., 49 Cliff St., N. Y.

United Metals Selling Co., 11 Broadway, N. Y.

Copper Hammers

Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Copper Rives and Burrs

Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Copper Tacks and Nails

Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Cordage

Nacomber & White Rope Co., Chicago

Sanson Cordage Works, Boston, Mass.

Silver Lake Co., Boston, Mass.

Core Ovens

Millet Core Oven Co., Brighton, Mass.

Cork Screws and Cork Pullers

Erie Specialty Co., Erie, Pa.

Corn Hooks

Withington & Cooley Mfg. Co., Jackson, Mich.

Corn Huskers

Wilcox Mfg. Co., Aurora, Ill.

Corn Shellers

Goulds Mfg. Co., Seneca Falls, N. Y.
Patch, A. H., Clarksville, Tenn.

Corrugated Iron and Steel

Garry Iron & Steel Roofing Co., Cleveland, O.

McCallough Iron Co., Wilmington, Del.

Scaff, Wm. B. & Sons, Pittsburgh.

Cotter Pin Machines, Automatic

Shuster, F. B. Co., New Haven, Conn.

Cotton Ties

American Steel Hoop Co., Battery Park Building, N. Y.

Counting Machines

Durant, W. N. Milwaukee, Wis.

Hart, R. A., Battle Creek, Mich.

Couplings, Compression

Sennett, Geo. B. Co., Youngstown, O.

Cow Ties

Onelda Community, Ltd., Niagara Falls, Cleveland, Ohio.

Cranes

Brown Hoisting Machinery Co., Inc., Cleveland, Ohio.

Chisholm & Moore Mfg. Co., Cleveland, Cleveland Crane & Car Co., Cleveland, O.

Niles Tool Works Co., 136-138 Liberty St., N. Y.

Northern Engineering Works, Detroit, Mich.

Pawling & Harnischfeger, Milwaukee, Wis.

Pneumatic Crane Co., Pittsburgh, Pa.

Reading Crane & Hoist Wks., Reading, Pa.

Ridgway, Craig & Son Co., Coatesville, Pa.

Spindel, J. G., Reading, Pa.

Crayon

Steward, D. M. Mfg. Co., Chattanooga, Tenn.

Crucibles

Dixon, Jos. Crucible Co., Jersey City, N. J.

Cupolas

Northern Engineering Works, Detroit.

Paxson, J. W. Co., Philadelphia, Pa.

Cupolas, Hot Blast

Byram & Co., Detroit, Mich.

Curry Combs

New York Stamping Co., Brooklyn, N. Y.

Cutlery

Cattaraugus Cutlery Co., Little Valley, N. Y.

Chatillon, John & Sons, 55 to 59 Cliff St., N. Y.

Dame, Stoddard & Co., Boston.

Goodell Co., Antrim, N. H.

Kimball, C. J. Co., Bennington, N. H.

Wiebusch & Hilger, Ltd., 9 to 15 Murray St., N. Y.

Cutting Off Machines

Hurlbut Rogers Mach. Co., So. Sudbury, Mass.

Dampers

Williams, A. C., Ravenna, O.

Dashes and Fenders

McKinnon Dash Co., Buffalo, N. Y.

Diamond Tools

Dickinson, Thos. L., 45 Vesey St., N. Y.

Dies

Adriance Mach. Works, Brooklyn, N. Y.

Biles, E. W. Co., Brooklyn, N. Y.

Ferracuta Mach. Co., Bridgeport, N. J.

Hay-Sudden Mfg. Co., Brooklyn, N. Y.

Mossberg, Frank Co., Attleboro, Mass.

Richard Mfg. Co., Bloomington, Pa.

Wilson & Smith, Worcester, Mass.

Door Belts.—See Belts and Gongs.**Door Checks and Springs**

Bardsley, Jos., 147 151 Baxter St., N. Y.

Ogden Mfg. Co., Newark, N. J.

Pullman Sash Balance Co., Rochester, N. Y.

Door Holders

Caldwell Mfg. Co., Rochester, N. Y.

Door Screens

Porter Screen Mfg. Co., Burlington, Vt.

Draught Springs

Burditt & Williams, Boston, Mass.

Draw Benches

Richard Mfg. Co., Bloomsburg, Pa.

Thompson, Hugh L., Waterbury, Ct.

Vulcan Foundry & Machine Co., New Castle, Pa.

Drill Grinders

Heid, L. S. & Son, Barre, Mass.

Sellers, Wm. & Co., Inc., Phila., Pa.

Washburn Shops of Worcester Polytechnic Inst., Worcester, Mass.

Wilmarth & Norman, Grand Rapids, Mich.

Drill Press Work

Straight Mfg. Co., Jamestown, N. Y.

Drilling Machines

Barnes, R. F. Co., Rockford, Ill.

Barnes, W. F. & John Co., Rockford, Ill.

Bush Mch. Tool Co., Springfield, Mass.

Rickford Drill & Tool Co., Cin., Ohio.

Bullard Machine Tool Co., Bridgeport, Ct.

Burnham, Geo. Co., Worcester, Mass.

Champion Idler & Forge Co., Lancaster, Pa.

Cincinnati Mch. Tool Co., Cincinnati, O.

Dallert, Thos. H. & Co., Philadelphia.

D'Amour & Littledale Mch. Co., 131 Worth St., N. Y.

Davis, W. F., Machine Co., Rochester, N. Y.

Detrick & Harvey Mch. Co., Baltimore, Md.

Foodick & Holloway Mach. Tool Co., Cincinnati, O.

Harrington, E. Son & Co., Phila., Pa.

Hill, Clarke & Co., Boston, Mass.

Hoefer Mfg. Co., Freeport, Ill.

Niles Tool Works Co., 136-138 Liberty St., N. Y.

Springfield Bros., Worcester, Mass.

Quint, A. D., Hartford, Conn.

Shuster, F. B. Co., New Haven, Conn.

Sibley & Ware, So. Bend, Ind.

Sigourney Tool Co., Hartford Conn.

Silver Mfg. Co., Salem, O.

Slate, Dwight Machine Co., Hartford, Ct.

Stow Flexible Shaft Co., Phila., Pa.

Wiley & Russell Mfg. Co., Greenfield, Mass.

York, S. M. Co., Cleveland, O.

Drilling Machines, Automatic

Gould & Eberhardt, Newark, N. J.

Drive Chains

Locke Steel Belt Co., Bridgeport, Conn.

Drop Forgings

Belden Machine Co., New Haven, Conn.

Billings & Spencer Co., Hartford, Conn.

Cape Ann Tool Co., Pigeon Cove, Mass.

Chicago Drop Forging & Fdry. Co., Kensington, Ill.

Clapp, E. D. Mfg. Co., Auburn, N. Y.

Consolidated Railway Electric Light- ing & Equipment Co., 100 Broadway, N. Y.

Eccles, Richard, Auburn, N. Y.

Indianapolis Drop Forging Co., Indian- apolis, Ind.

Keystone Drop Forge Co., Philadelphia.

Kilborn & Bishop Co., New Haven, Conn.

Page-Storms Drop Forge Co., Chicopee Falls, Mass.

R. I. Tool Co., Providence, R. I.

Scranton Forging Co., Scranton, Pa.

Servan, M. & Son Co., New Haven, Ct.

Strieby & Foote Co., Newark, N. J.

Tranue & Williams Co., Alliance, O.

Williams, J. H. & Co., Brooklyn, N. Y.

Wyman & Gordon, Worcester, Mass.

Drop Hammers

Billings & Spencer Co., Hartford, Conn.

Williams, White & Co., Moline, Ill.

Drop Presses

Manville, E. J. Mch. Co., Waterbury, Ct.

Minor & Peck Mfg. Co., New Haven, Ct.

Mossberg & Granville Mfg. Co., Providence, R. I.

Vulcan Iron Works, Chicago, Ill.

Dumb Waiters

Energy Elevator Co., Philadelphia, Pa.

Spindel, J. G., Reading, Pa.

Storm Mfg. Co., Newark, N. J.

Variety Machine Co., Warsaw, N. Y.

Dump Cars

Atlas Bolt & Screw Co., Cleveland, O.

Dynamos and Motors, Electric

Chicago House Wrecking Co., Chicago.

Eddy Electric Mfg. Co., Windsor, Conn.

General Electric Co., Schenectady, N. Y.

New England Motor Co., Lowell, Mass.

Sturtevant, B. F. Co., Boston, Mass.

Westinghouse Elec. & Mfg. Co., Pitts- burgh, Pa.

Eave Trough Hangers

Berger Bros. Co., Philadelphia, Pa.

Oatman Bros., Medina, O.

Edge Tools

Buck, Chas., Millbury, Mass.

Buck Bros., Millbury, Mass.

Ferro-Carbon Castings Co., Phila., Pa.

White, L. & I. J. Co., Buffalo, N. Y.

Egg Benters

Lyon, Nelson, Albany, N. Y.

Standard Co., Boston, Mass.

Egg Openers

Hartigan, W. R., Collinsville, Ct.

Electric Belts and Supplies

Ostrander, W. R. & Co., 204 Fulton St.

Electric Controllers

Electric Controller & Supply Co., Cleve- land, O.

Electric Lighting and Power Ap- paratus

Eddy Electric Mfg. Co., Windsor, Conn.

General Electric Co., Schenectady, N. Y.

Pointer & Lester, Toledo, O.
Presbrey Fire Brick Co., Taunton, Mass.
Valentine, M. D. & Bro. Co., Woodbridge, N. J.

Fire Extinguishers
International Sprinkler Co., Phila., Pa.

Fishing Tackle
Clark, Horrocks & Co., Utica, N. Y.
Dane, Stoddard & Co., Boston, Mass.

Fish Rods
Clark, Horrocks & Co., Utica, N. Y.

Flexible Metallic Tubing
Sharp, Klumph & Sisson Co., Chicago.

Flexible Shafting
Chicago Flexible Shaft Co., Chicago, Ill.
Stow Flexible Shaft Co., Phila., Pa.
Stow Mfg. Co., Binghamton, N. Y.

Flint and Emery Paper
Baeder, Adamson & Co., Phila., Pa.

Floor and Ceiling Platts
Coddling Mfg. Co., Bristol, Conn.

Flue Cleaners
Jackson Flue Scraper Co., Jackson, N. Y.
Jarecki Mfg. Co., Erie, Pa.

Fly Killers
Bigelow, J. F., Worcester, Mass.

Fly Screens
Porter Screen Mfg. Co., Burlington, Vt.

Foot Rests
Star Heel Plate Co., Newark, N. J.

Forges, Portable, &c.
Bradley Co., Syracuse, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.

Fairbanks Co., 511 Broadway, N. Y.
Sturtevant, B. F. Co., Boston, Mass.

Forgings, Iron and Steel
Baker, Jas. H. Mfg. Co., Pittsburgh, Pa.
Bethlehem Steel Co., S. Bethlehem, Pa.
Eastern Forge Co., Boston, Mass.

Frankford Steel Co., Phila., Pa.
Hay-Budden Mfg. Co., Brooklyn, N. Y.
Otis Steel Co., Ltd., Cleveland, Ohio.
Pittsburgh Shear, Knife & Machine Co., Pittsburgh, Pa.

Titusville Forge Co., Titusville, Pa.
Vulcanus Forging Co., Cleveland, O.

Forks, Hay and Manure
Continental Tool Co., Frankfort, N. Y.
Iowa Farming Tool Co., Ft. Madison, Ia.
Withington & Cooley Mfg. Co., Jackson, O.

Foundry Facilities
Obermayer, S. Co., Cincinnati, O.

Foundry Lamps
Forest City Fd. & Mfg. Co., Cleveland, Pa.
Faxon, J. W. Co., Phila., Pa.

Foundry Supplies
Gilmour, J., Bennett Building, N. Y.
Obermayer, S. Co., Cincinnati, Ohio.
Osborn Mfg. Co., Cleveland, O.

Faxon, J. W. Co., Phila., Pa.
Pointer & Lester, Toledo, O.

Friction Clutches
Eastern Machinery Co., New Haven, Ct.
Hess, Snyder & Co., Massillon, O.

Furnaces, Foundry
Byram & Co., Detroit, Mich.

Furnaces, Oil, Gas and Coal
Rockwell Engineering Co., 26 Cortlandt St., N. Y.

Fuses
Ensign Blackford & Co., Simsbury, Ct.

Gages
Crosby Steam Gage & Valve Co., Boston.

Galvanized Wages
Keen & Hagerly Mfg. Co., Baltimore.

Galvanizing
Blackman & Kling, 301 Greenwich St., N. Y.

Empire Pipe Bending & Supply Co., Brooklyn, N. Y.

Galvanizing Process
U. S. Electro Galvanizing Co., 348 Broadway, N. Y.

Garden Rakes
Cronk Hanger Co., Elmira, N. Y.

Jenkins Iron & Tool Co., Howard, Pa.

Garden Tools
Bateman Mfg. Co., Grenloch, N. J.

Deascher, H. F. Co., Hamilton, O.

Withington & Cooley Mfg. Co., Jackson, O.

Gas Compressor
Uehling, Steinbart & Co., Ltd., Carlstadt, N. J.

Gas Compressors
Norwalk Iron Works Co., So. Norwalk, Conn.

Gas Furnaces
Am. Gas Furnace Co., 23 John St., N. Y.

Chicago Flexible Shaft Co., Chicago, Ill.

Gaskets, Iron
Smooth On Mfg. Co., Jersey City, N. J.

Gas Producers
Duff Patents Co., Allegheny, Pa.

Smythe, S. R. Co., Inc., Pittsburgh, Pa.

Swindell, W. & Bro., Pittsburgh, Pa.

Gas Stoves
Reineke, Wilson Co., Pittsburgh, Pa.

Gauges, Rolling Mill
Haines Gauge Co., Philadelphia, Pa.

Gears
Boston Gear Works, Boston, Mass.

Gleason Tool Co., Rochester, N. Y.

Morse, Williams & Co., Phila., Pa.

Nuttall, R. D. Co., Pittsburgh, Pa.

Poole, Robt. Son & Co., Baltimore, Md.

Gears, Sawblade
Horsburgh & Scott, Cleveland, Ohio.

Gear Cutters
Becker Bradward Milling Machine Co., Hyde Park, Mass.

Gould & Eberhardt, Newark, N. J.

Whitton, D. E. Mch. Co., New London, Conn.

Generators, Electric
Westinghouse Elec. & Mfg. Co., Pittsburgh, Pa.

Gimlets
Norton Mfg. Co., Chester, Conn.

Glass Cutters
Barrett, W. L., Bristol, Conn.

Bultman, F. H. & Co., Cleveland, O.

Monce, S. G., Unionville, Conn.

Smith & Hemenway Co., 294 Broadway, N. Y.

Glass Cutting Boards
Lufkin Rule Co., Saginaw, Mich.

Glue
Baeder, Adamson & Co., Phila., Pa.

Golf Goods
Bridgeport Gun Implement Co., 512 Broadway, N. Y.

Gongs—See Bells and Gongs.

Grate Bars
Stowell Mfg. & Fdry. Co., So. Milwaukee, Wis.

Grates, Rocking
Sennett, Geo. B. Co., Youngstown, O.

Grease, Axle
Snow Flake Axle Grease Co., Boston.

Grinding and Polishing Mchs.
American Emery Wheel Works, Providence, R. I.

Barnes, W. F. & John Co., Rockford, Ill.

Beely, Chas. H. & Co., Chicago, Ill.

Brown & Sharpe Mfg. Co., Providence, R. I.

Cincinnati Milling Mach. Co., Cincinnati, O.

Diamond Mach. Co., Providence, R. I.

Landis Tool Co., Waynesboro, Pa.

Norhampton Emery Wheel Co., Leeds, Mass.

Norton Emery Wheel Co., Worcester, Mass.

Safety Emery Wheel Co., Springfield, O.

Springfield Mfg. Co., Bridgeport, Conn.

Tanite Co., Stroudsburg, Pa.

Universal Mach. Co., Providence, R. I.

Wilmarth & Norman, Grand Rapids, Mich.

Grindstones
Atlantic Grindstone Co., Providence, R. I.

Cleveland Stone Co., Cleveland, O.

Grubbing Machine
New Century Mfg. Co., 43 E. 8th St., N. Y.

Guns
Harrington & Richardson Arms Co., Worcester, Mass.

Johnson, Iver Arms & Cycle Works, Fitchburg, Mass.

Marlin Fire Arms Co., New Haven, Ct.

Remington Arms Co., 515 Broadway, New York

Hack Saws
Diston, Henry & Sons, Inc., Phila., Pa.

Goodell-Fratt Co., Greenfield, Mass.

Springfield Machine Screw Co., Springfield, Mass.

Starrett, L. S. Co., Athol, Mass.

Hammers
Heller Bros. Co., Newark, N. J.

Logan & Strobridge Iron Co., New Brighton, Pa.

Hammerheads
Palmer, L. E., Middletown, Conn.

Blacknell Hdw. Co., Janesville, Wis.

Hand Screws
Bliss, R. Mfg. Co., Pawtucket, R. I.

Handle Machinery
Defiance Machine Works, Defiance, O.

Hangers, Barn Door
Myers, F. E. & Bro., Ashland, O.

Hangers, Door
Chicago Spring Butt Co., Chicago, Ill.

Coburn, Frolley Track Mfg. Co., Holyoke, Mass.

Cronk Hanger Co., Elmira, N. Y.

Lane Bros., Poughkeepsie, N. Y.

Louden Machinery Co., Fairfield, Iowa.

McCabe Hanger Mfg. Co., 534-543 W. 23d St., N. Y.

McKinney Mfg. Co., Allegheny, Pa.

Ney Mfg. Co., Canton, Ohio.

Seawell Mfg. & Foundry Co., So. Milwaukee, Wis.

Wilcox Mfg. Co., Aurora, Ill.

Hangers, Shafting
Ball Bearing Co., Boston, Mass.

Dodge Mfg. Co., Milwaukee, Ind.

Hardware Comm'n Merchants
Graham, Jno. H. & Co., 113 Chambers St., N. Y.

Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Hardware Jobbers
Supplier Hdw. Co., Phila., Pa.

Hardware Manufacturers
Arcade Mfg. Co., Freeport, Ill.

Central Hardware Co., Phila., Pa.

Logan & Strobridge Iron Co., New Brighton, Pa.

Millers Falls Co., 28 Warren St., N. Y.

Ney Mfg. Co., Canton, Ohio.

Nicol & Co., Chicago, Ill.

Parker, Chas., Co., Meriden, Conn.

Peck, Stow & Wilcox Co., 21 Murray St., N. Y.

Stanley Works, New Britain, Conn.

Union Forge Co., 108 Chambers St., N. Y.

Van Wagoner & Williams Hdw. Co., Cleveland, O.

Wrightsville Hdw. Co., Wrightsville, Pa.

Hardware Mfrs.' Agents
Graham, John H. & Co., 113 Chambers St., N. Y.

Wiebusch & Hilger, Ltd., 9-15 Murray St., N. Y.

Hardware Shelving
Warren, J. D. Mfg. Co., Chicago, Ill.

Hardware Specialties
Acme Shear Co., Bridgeport, Conn.

Berger Bros. Co., Philadelphia, Pa.

Enterprise Mfg. Co., of Pa., Phila., Pa.

Graham, John H. & Co., 113 Chambers St., N. Y.

Pleuger & Henger Mfg. Co., St. Louis, Mo.

Scranton & Co., The, New Haven, Ct.

Smith & Egge Mfg. Co., Bridgeport, Ct.

Harness Snaps
Covert Mfg. Co., West Troy, N. Y.

Covert's Saddlery Wks., Farmer, N. Y.

Imperial Bit & Snap Co., Racine, Wis.

Hasps and Staples
McKinney Mfg. Co., Allegheny, Pa.

Hatchets
Jenkins Iron & Tool Co., Howard, Pa.

Hay Knives
Clark & Parsons Co., E. Wilton, Me.

Ney Mfg. Co., Canton, Ohio.

Hay Tools
Louden Machinery Co., Fairfield, Iowa.

Myers, F. E. & Bro., Ashland, O.

Ney Mfg. Co., Canton, O.

Heating and Ventilating Apparatus
American Blower Co., Detroit, Mich.

Bayley, Wm. & Sons Co., Milwaukee, Wis.

Boston Blower Co., Hyde Park, Mass.

Buffalo Forge Co., Buffalo, N. Y.

Sturtevant, B. F. Co., Boston, Mass.

Heel Plates
Star Heel Plate Co., Newark, N. J.

Hinges
Jenkins Iron & Tool Co., Howard, Pa.

Lanz, M. & Sons, Pittsburgh, Pa.

Lawrence Bros., Sterling, Ill.

McKinney Mfg. Co., Allegheny, Pa.

Stanley Works, New Britain, Conn.

Tiebout, W. & J., 118 Chambers St., N. Y.

Hitching Posts
Hartman Mfg. Co., 309 Broadway, N. Y.

Hoes, Garden, Planters', &c.
Continental Tool Co., Frankfort, N. Y.

Iowa Farming Tool Co., Fort Madison, Iowa.

Jenkins Iron & Tool Co., Howard, Pa.

Holsts, Air
Pedrick & Ayer Co., Philadelphia, Pa.

Ridgway, Craig & Son Co., Coatesville, Pa.

Holsts, Chain and Rope
Box, Alfred & Co., Philadelphia, Pa.

Eckstein, C. G., 240 Centre St., N. Y.

Fulton Iron & Engine Works, Detroit, Mich.

Harrington, E. Son & Co., Phila., Pa.

McCoy, Jos. F. & Co., 28 Warren St., Reading, Pa.

Speidel, J. O., Reading, Pa.

Holding Machines
Eastern Machinery Co., New Haven, Ct.

Lidgerwood Mfg. Co., 96 Liberty St., N. Y.

Hollow Mill
Geometric Drill Co., Westville, Conn.

Hollow Ware
Avery Stamping Co., Cleveland, Ohio.

Cleveland Stamping & Tool Co., Cleveland, O.

New York Stamping Co., Brooklyn, N. Y.

Rogers, Jno. M. Boat-Gauge & Drill Works, Gloucester, City, N. J.

Horse Nails
Capewell Horse Nail Co., Hartford, Ct.

Mooney, W. M. & Co., Ausable Chasm, N. Y.

National Horse Nail Co., Vergennes, Vt.

Putnam Nail Co., Neponset, Boston.

Wiebusch & Hilger, Ltd., 9-15 Murray St., N. Y.

Horse and Mule Shoes
American Steel & Wire Co., Chicago, Ill.

Burden Iron Co., Troy, N. Y.

Hollow Grip Horse Shoe Co., Chicago.

Phoenix Horse Shoe Co., Poughkeepsie, N. Y.

Rhone Island Perkins Horse Shoe Co., Providence, R. I.

Hose
Boston Belting Co., Boston, Mass.

Peerless Rubber Mfg. Co., 16 Warren Street, New York.

Hose Coupling, Air
Pedrick & Ayer Co., Philadelphia, Pa.

Hose Washers
Canfield, H. O., Bridgeport, Conn.

House Furnishing Specialties
Lloyd Mfg. Co., Minneapolis, Minn.

Williams, A. C. Ravenna, O.

Hydraulic Jacks
Dudgeon, Richard, 24 Columbia St., N. Y.

Rendener, A. L. Sons, Wilmington, Ct.

Watson-Stillman Co., 304 E. 43d St., N. Y.

Hydraulic Machinery
Watson-Stillman Co., 304 E. 43d St., N. Y.

Hydraulic Presses
Cornell, J. B. & J. M., 26th St. and 11th Ave., N. Y.

Hydraulic Tools
Watson-Stillman Co., 304 E. 43d St., N. Y.

Wood, R. D. & Co., Phila., Pa.

Ice Cream Freezers
North Broad Mfg. Co., Philadelphia, Pa.

Tatum, S. C. Co., Cincinnati, O.

White Mountain Freezer Co., Nashua, N. H.

Ice Making Machinery
York Mfg. Co., York, Pa.

Ice Picks
Erie Specialty Co., Erie, Pa.

Ice Shredders
Enterprise Mfg. Co., Philadelphia, Pa.

Erie Specialty Co., Erie, Pa.

Ice Tools
Gerlach, Peter & Co., Cleveland, O.

Williams, A. C. Ravenna, O.

Wood, Wm. T. & Co., Arlington, Mass.

Injectors
Jenkins Bros., New York

Lunkenheimer Co., Cincinnati, Ohio.

Watson, S. A., Erie, Pa.

Insurance, Boiler
Hartford Steam Boiler Inspection and Insurance Co., Hartford, Conn.

Iron and Steel, Swedish
Harvey, Arthur C. Co., Boston, Mass.

Lillenberg, N., 150 Broadway, N. Y.

Milne, A. & Co., 1 Broadway, N. Y.

Potts, Horace T. & Co., Phila., Pa.

Iron Commission Brokers
Gibben & Co., Phila., Pa.

Cotton, Barclay W. & Co., Phila., Pa.

- American Tool Wks. Co., Cincinnati, O.
 Baird, U. Machinery Co., Pittsburgh, Pa.
 Barnes, W. F. & John Co., Rockford, Ill.
 Baum Mch. Tool Co., Springfield, Mass.
 Becker-Brainard Milling Mach. Co., Hyde Park, Mass.
 Bliss E. W. Co., Brooklyn, N. Y.
 Bowler, Geo. H., Cleveland, O.
 Briggs, Marvin, 12 Broadway, N. Y.
 Brown & Sharpe Mfg. Co., Providence, R. I.
 Bullard Mch. Tool Co., Bridgeport, Ct.
 Carlin Machinery & Supply Co., Allegheny, Pa.
 Carlin's Sons Thos., Allegheny, Pa.
 Chicago House Wrecking Co., Chicago, Ill.
 Cincinnati Milling Mach. Co., Cin. O.
 Cincinnati Planer Co., Cincinnati, O.
 Conrad, T. P., Phila., Pa.
 Cornell, J. B. & J. M., 26th St. and 11th Ave., New York City.
 Co. Grey, C. H. Mach. Wks., Fitchburg, Mass.
 Davis, W. P. Machine Co., Rochester, N. Y.
 Dawson, A. L. & Co., Chicago, Ill.
 Dawson & Goodwin, Chicago, Ill.
 Detrick & Harvey Mch. Co., Baltimore, Md.
 Diamond Drill & Mch. Co., Birdsboro, Pa.
 Don, J. B. & Co., Chicago, Ill.
 Draper Mach. Tool Co., Worcester, Mass.
 Du Bois Iron Works, Du Bois, Pa.
 Farrell Fdry & Mch. Co., Ansonia, Conn.
 Ferracute Machine Co., Bridgeport, N. J.
 Fish, H. C. Machine Works, Worcester, Mass.
 Garvin Machine Co., Spring and Varick Sts., N. Y.
 General Supply Co., 40 John St., N. Y.
 Geometric Drill Co., Westville, Conn.
 Gray, Robt. J., 52-54 E. 13d St., N. Y.
 Hannan & Finner, Springfield, Mass.
 Hendey Machine Co., Torrington, Conn.
 Hill, Henry F., Boston, Mass.
 Hill, Clarke & Co., Boston, Mass.
 Illinois Maintenance Co., Chicago, Ill.
 Johnson, Israel H., Jr., & Co., Phila.
 Johnson, Wm. C. & Sons Mch. Co., St. Louis, Mo.
 Kaiser, A. V. & Co., Phila., Pa.
 Keagy & Lear Mch. Co., Cohasset, O.
 Lodge & Shipley Mch. Tool Co., Cin. O.
 Lund, S. T., Boston, Mass.
 McCabe, J. J., 14 Dey Street, N. Y.
 McDowell & Co., Pittsburgh, Pa.
 McDowell Stocker & Co., Chicago, Ill.
 Machinists' Supply Co., Roca-stre, N. Y.
 Manning, Maxwell & Moore, 85-89 Liberty St., N. Y.
 Manville E. J. Mach. Co., Waterbury, Ct.
 Marshall & Huchcraft Mchry. Co., Chicago, Ill.
 Mass. Brg. Frank Co., Attleboro, Mass.
 National Machine & Tool Co., Tiffin, Ohio.
 New Doty Mfg. Co., Janesville, Wis.
 New Haven Mfg. Co., New Haven, Conn.
 New York Machinery Depot, 175 Broadway, New York.
 Niles Tool Works Co., 138 Liberty St., N. Y.
 Nilson, A. H. Mch. Co., Bridgeport, Ct.
 Paradox Machinery Co., Chicago, Ill.
 Pennsylvania Machine Co., Phila., Pa.
 Phila. Machine Tool Co., Phila., Pa.
 Pittsburgh Mfg. Co., Pittsburgh, Pa.
 Pond Machine Tool Co., Plainfield, N. J.
 Poole, Robt. & Son Co., Baltimore, Md.
 Potter & Johnston Co., Pawtucket, R. I.
 Poulter & Co., Phila., Pa.
 Pratt & Whitney Co., Hartford, Conn.
 Prentiss Bros., Worcester, Mass.
 Prentiss Tool & Supply Co., 115 Liberty St., N. Y.
 Rainier & Williams, Chicago, Ill.
 Reade, Wm. A. & Co., Cleveland, O.
 Seyfert's Sons L. F., Philadelphia, Pa.
 Seymour Tool Co., Hartford, Conn.
 Standard Machinery & Equipment Co., Cleveland, O.
 Thomas & Lowe Machinery Co., Providence, R. I.
 Toomey, Frank, Philadelphia, Pa.
 Waterbury Farrel Foundry & Mch. Co., Waterbury, Conn.
 Wetherill, Robert & Co., Chester, Pa.
 Wicks Bros., Pittsburgh, Pa.
 Windsor Machine Co., Windsor, Vt.
 Worner, C. C. & Co., Detroit, Mich.
 York, S. M. Co., Cleveland, O.
- Machinery, Wood Working**
 DeLancey Machine Wks., DeLancey, O.
 F. J. J. & Egan Co., Cincinnati, O.
- Machinery Springs**
 Scott, Chas. Spring Co., Phila., Pa.
- Machinery Builders**
 Chapman, J. B. & Co., Springfield, Mass.
- Machine Knives**
 Loyd, John Co., 538-562 Water St., N. Y.
- Machine Needles**
 Excelesior Needle Co., Torrington, Ct.
- Machine Screws—See Screws, Machine**
- Machine Screw Work**
 Spencer Automatic Mch. Screw Co., Hartford, Conn.
- Machine Tools—See Machinery**
- Machine Work**
 Austin, R. D. Co., Pittsburgh, Pa.
- Machine Wrenches**
 Billings & Spencer Co., Hartford, Conn.
- Machinists' Scales**
 Starrett, L. S. Co., Athol, Mass.
- Machinists' Tools and Supplies**
 Billings & Spencer Co., Hartford, Conn.
 General Supply Co., 40 John St., N. Y.
 Keystone Mfg. Co., Buffalo, N. Y.
 King, J. M. & Co., Waterford, N. Y.
- Magnetic Separators**
 Creson, Geo. V. Co., Phila., Pa.
- Manganese Bronze**
 Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.
- Manufacturing Properties**
 Harburg Fdry & Mch. Wks., Harburg, Pa.
 Hillman, J. H. & Co., Pittsburgh, Pa.
- Manufacturing Sites**
 Chicago, Milwaukee & St. Paul R. R., Chicago, Ill.
 Southern Railway Co., Washington, D. C.
- Measuring Machines**
 Rogers, Jno. M. Best, Gauge & Drill Wks., Gloucester City, N. J.
- Meat Choppers**
 Brown, Chas. J., 161 Duane St., N. Y.
- Enterprise Mfg. Co. of Pa., Phila., Pa.
 Peck, Stow & Wilcox Co., 27 Murray St., New York.
 Streeter, N. R. & Co., Rochester, N. Y.
 Woodruff, O. D., Potomac, Pa.
- Metal Brokers**
 American Metal Co., 52 Broadway, N. Y.
- Metals**
 Hendricks Bros., 49 Cliff St., N. Y.
 Hoteller, Theo. & Co., Buffalo, N. Y.
 Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.
 Rutter, A. T., 256 Broadway, N. Y.
 United Metals Selling Co., 11 Broadway, N. Y.
- Metal Goods Manufacturers**
 Straight Mfg. Co., Jamestown, N. Y.
- Metal Polish**
 Hoffman, Geo. W., Indianapolis, Ind.
- Metal Saws**
 Vanduyck, J. B., 136 Liberty St., N. Y.
- Metal Spinning**
 Goodwin & Kintz Co., Winsted, Conn.
- Metal Wheels**
 Electric Wheel Co., Quincy, Ill.
- Milling Machines**
 Adams Co., Dubuque, Iowa.
 Becker-Brainard Milling Machine Co., Hyde Park, Mass.
 Brown & Sharpe Mfg. Co., Providence, R. I.
 Carter & Hake Mch. Co., Winsted, Ct.
 Cincinnati Milling Mach. Co., Cin. O.
 Fox Machine Co., Grand Rapids, Mich.
 Garvin Machine Co., Spring and Varick Sts., N. Y.
 Niles Tool Works Co., 138-138 Liberty St., N. Y.
 Shuster, F. R. Co., New Haven, Conn.
 Thurston Mfg. Co., Providence, R. I.
- Mining Knives**
 Bishop, Geo. H. & Co., Cincinnati, O.
- Mining Machinery**
 Allis, E. P. Co., Milwaukee, Wis.
 Rand Drill Co., 123 Broadway, N. Y.
- Mining Screens**
 Harrington & King Perforating Co., Chicago, Ill.
 Howard & Morse, 45 Fulton St., N. Y.
 Michigan Wire Cloth Co., Detroit, Mich.
- Miter Boxes**
 Thomson Bros. & Co., Lowell, Mass.
- Molding Machines**
 Adams Co., Dubuque, Iowa.
 Maywood Fdry. & Mch. Co., Chicago, Ill.
- Motor Fans**
 Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.
- Motors, Air**
 Stow Flexible Shaft Co., Phila., Pa.
- Motors, Electric—See Dynamos and Motors, Electric**
- Nail Clippers**
 Cook, H. C. Co., Ansonia, Conn.
- Nail Machinery**
 Pittsburgh Mfg. Co., Pittsburgh, Pa.
- Nail Pullers**
 Hagen & Reid, Troy, N. Y.
 Scranton & Co., The, New Haven, Conn.
 Smith & Hemenway Co., 236 Broadway, N. Y.
 Snow, L. T., New Haven, Conn.
- Name Plates, Machinery**
 Becker Name Plate Co., Boston, Mass.
 Murdoch Parlor Gate Co., Boston, Mass.
- Natural Gas Pumps**
 Norwalk Iron Wks. Co., So. Norwalk, Ct.
- Nickel Platers' Supplies**
 Eddy Electric Mfg. Co., Windsor, Conn.
- Nickeloid**
 American Nickeloid Co., Peru, Ill.
- Norway Shapes**
 Rowland, William & Harvey, Frankford, Philadelphia.
- Nuts—See Bolts**
- Nuts, Self-Locking**
 National Elastic Nut Co., Milwaukee, Wis.
- Nut Machines**
 Dunham Nut Co., Unionville, Conn.
- Oil Burning Appliances**
 Rockwell Engineering Co., 26 Cortlandt St., N. Y.
- Oil Extractor**
 Reed & Curtis Mch. Screw Co., Worcester, Mass.
- Oil Heaters—See Oil Stoves**
- Oil Stones**
 Pike Mfg. Co., Pike Station, N. H.
- Oil Stoves—(See Stoves Oil, Vapor and Gasoline)**
- Oilers**
 Bay State Stamping Co., Worcester, Mass.
 Gem Mfg. Co., Pittsburgh, Pa.
 Hammer & Co., Branford, Conn.
 Stoutenburg Mfg. Co., Keltsburg, Ill.
 Wilcox & Hobbs Mfg. Co., Bridgeport, Conn.
- Oilless Bearings**
 North American Metalline Co., Long Island City, N. Y.
- Ore Breakers**
 Aultman Co., Canton, O.
 Creson, Geo. V. Co., Phila., Pa.
- Ores**
 Blair, Reed F. Co., Pittsburgh, Pa.
 Samuel, Frank, Philadelphia, Pa.
 Wister, Francis, Philadelphia, Pa.
- Ovens, Portable**
 Blodgett, G. S. Co., Burlington, Vt.
- Ox Shoes**
 Scranton Forging Co., Scranton, Pa.
 Woodruff, Walter W. & Sons, Mt. Carmel, Conn.
- Packing**
 Boston Belting Co., Boston, Mass.
 Morrison, Robert, St. Louis, Mo.
 Peerless Rubber Mfg. Co., 16 Warren Street, N. Y.
- Packing, Iron**
 Smooth On Mfg. Co., Jersey City, N. J.
- Paints**
 Dixon, Jos. Crucible Co., Jersey City.
 Standard Paint Co., 77-79 John St., N. Y.
- Pants Stretcher**
 Covert Mfg. Co., West Troy, N. Y.
- Patent Solicitors**
 Goepp, L. Paul, 281 Broadway, N. Y.
 Howson & Howson, Philadelphia and Washington.
 Stocking, E. B., Washington, D. C.
- Patterns**
 Balkwill Pattern Wks., Cleveland, O.
 Norwalk Pattern & Mfg. Co., So. Norwalk, Conn.
- Pattern Letters**
 Butler, A. G., 103 Beekman St., N. Y.
- Perforated Metal**
 Clinton Wire Cloth Co., Clinton, Mass.
 Harrington & King Perforating Co., Chicago, Ill.
 Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.
- Phosphor Bronze**
 Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.
 Phosphor Bronze Smelting Co., Limited, Philadelphia.
- Phosphor Tin**
 Crescent Phosphorized Metal Co., Philadelphia, Pa.
 Syracuse Smelting Wks., Syracuse, N. Y.
- Picture Wire**
 Oakswan Mills Co., Norwich, Conn.
- Pig Casting Machines**
 Heyl & Patterson, Pittsburgh, Pa.
- Pig Iron**
 Alabama Consolidated Coal & Iron Co., Birmingham, Ala.
 Baird, C. R. & Co., Phila., Pa.
 Cherry Valley Iron Co., Pittsburgh, Pa.
 Dimmick, J. K. & Co., Phila., Pa.
 Hickman, Williams & Co., Chicago, Ill.
 Houston, C. B. & Co., Philadelphia, Pa.
 Nicoll, B. & Co., 59-61 Wall St., N. Y.
 Republic Iron & Steel Co., Chicago.
 Samuel, Frank, Philadelphia, Pa.
 Sloss-Sheffield Steel & Iron Co., Birmingham, Ala.
 Snyder, W. F. & Co., Pittsburgh, Pa.
 Superior Charcoal Iron Co., Grand Rapids, Mich.
 Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
 Virginia Iron, Coal and Coke Co., Bristol, Va.—Tenn.
- Pig Iron Analysis**
 Church, S. R., San Francisco, Cal.
- Pig Iron Storage**
 Am. Pig Iron Storage Warrant Co., 4 Wall St., N. Y.
- Pile Drivers**
 Vulcan Iron Works, Chicago, Ill.
- Pipe, Bent**
 National Pipe Bending Co., New Haven, Conn.
- Pipe, Cast**
 National Tube Co., Pittsburgh, Pa.
 Whitlock Coil Pipe Co., Hartford, Ct.
- Pipe Coupling**
 Williams, J. H. & Co., Brooklyn, N. Y.
- Pipe Cutting and Threading Machines**
 Armstrong Mfg. Co., Bridgeport, Conn.
 Bignall & Keeler Mfg. Co., Edwardsville, Ill.
 Curtis & Curtis, Bridgeport, Conn.
 Jarecki Mfg. Co., Erie, Pa.
 Livermore, Homer F., Boston, Mass.
 Merrill Mfg. Co., Toledo, O.
 Saunders' Sons, D., Yonkers, N. Y.
- Pipe Fittings**
 Best Mfg. Co., Pittsburgh, Pa.
 Crane Co., Chicago.
 Pittsburgh Valve, Foundry & Construction Co., Pittsburgh, Pa.
- Pipe Grips**
 Frontis Vise Co., 44 Barclay, N. Y.
- Pipes, Fittings, &c.**
 Jarecki Mfg. Co., Erie, Pa.
 McNab & Harlin Mfg. Co., N. Y.
- Pipe, Riveted Steel**
 Pollock, W. B. Co., Youngstown, O.
 Scalfie, Wm. B. & Sons, Pittsburgh.
 Warren City Boiler Works, Warren, O.
- Pipe, Water and Gas**
 National Tube Co., Pittsburgh, Pa.
 Red Jacket Mfg. Co., Davenport, Iowa.
 U. S. Cast Iron Pipe & Foundry Co., Phila., Pa.
 Wood, R. D. & Co., Philadelphia, Pa.
- Piston Rods, Tobis Bronze**
 Ansonia Brass & Copper Co., 99 John St., N. Y.
- Planes**
 Stanley Rule & Level Co., N. Y.
- Planers**
 Amer. Tool Works Co., Cincinnati, O.
 Baird, U. Machinery Co., Pittsburgh, Pa.
 Cincinnati Planer Co., Cincinnati, Ohio.
 Detrick & Harvey Mch. Co., Baltimore.
 Draper Mch. Tool Co., Worcester, Mass.
 Pond Machine Tool Co., Plainfield, N. J.
 Whitcomb Mfg. Co., Worcester, Mass.
 Wilson, W. A., Rochester, N. Y.
- Plated Ware**
 International Silver Co., Meriden, Ct.
- Plates, Iron and Steel**
 Jones & Laughlin, Ltd., Pittsburgh, Pa.
 Lukens Iron & Steel Co., Coatesville, Pa.
 Singer, Nimick & Co., Inc., Pittsburgh, Pa.
 Wood, Alan Co., Philadelphia.
- Plate Iron Work**
 Scalfie, Wm. B. & Sons, Pittsburgh.
- Pliers**
 Bridgeport Mfg. Co., Bridgeport, Conn.
 Cronk Hanger Co., Elmira, N. Y.
- Pneumatic Tools**
 Phila. Pneumatic Tool Co., Phila., Pa.
- Pocket Knives**
 Cattaraugus Cutlery Co., Little Valley, N. Y.
- Polishing Wheels**
 Divine Bros. Co., Utica, N. Y.
- Portable Track**
 Atlas Bolt & Screw Co., Cleveland, O.
- Poultry Fencing**
 DeKalb Fence Co., DeKalb, Ill.
- Poultry Nettings**
 Gilbert & Bennett Mfg. Co., 44 Cliff St., N. Y.
 N. J. Wire Cloth Co., Trenton, N. J.
 Tyler, W. S. Co., Cleveland, O.
 Wright & Colton Wire Cloth Co., Worcester, Mass.
- Power Hack Saws**
 Hoefler Mfg. Co., Freeport, Ill.
- Power Hammers**
 Beaudry & Co., Boston, Mass.
 Bradley Co., Syracuse, N. Y.
 Diemel & Elenhardt, Philadelphia.
 Dupont Mfg. Co., St. Johnsbury, Vt.
 Kidder, R. E., Worcester, Mass.
 Miner & Peck Mfg. Co., New Haven, Ct.
 Scranton & Co., The, New Haven, Conn.
- Power Transmitting Machinery**
 Creson, Geo. V. Co., Phila., Pa.
 Dodge Mfg. Co., Mishawaka, Ind.
 Norwalk Iron Wks. Co., So. Norwalk, Ct.
- Pressed Metal Work**
 Avery Stamping Co., Cleveland, Ohio.
- Presses, Power**
 Adriance Mach. Works, Brooklyn, N. Y.
 Bliss, E. W. Co., Brooklyn, N. Y.
 Cross & Speirs Mch. Co., Waterbury, Ct.
 Ferracute Mach. Co., Bridgeport, N. J.
 Hibbard, W. H., Brooklyn, N. Y.
 Hilles & Jones Co., Wilmington, Del.
 Keagy & Lear Mch. Co., Cohasset, O.
 Lemmer, Chas. & Co., Brooklyn, N. Y.
 Manville, E. J. Mch. Co., Waterbury, Ct.
 Mosberg & Granville Mfg. Co., Providence, R. I.
 Niagara Machine & Tool Wks., Buffalo.
 Perkins Machine Co., Boston, Mass.
 Phila. Machine Tool Co., Phila., Pa.
 Rudolph & Krummel, Chicago, Ill.
 Shuster, F. B. Co., New Haven, Conn.
- Price Cards and Holders**
 Menagh, John S., Jersey City, N. J.
- Projectiles**
 National Tube Co., Pittsburgh, Pa.
- Pulleys**
 Amer. Pulley Co., Phila., Pa.
 Dodge Mfg. Co., Mishawaka, Ind.
 Eastern Machinery Co., New Haven, Ct.
 Evans, G. F., Boston, Mass.
 Hess Snyder & Co., Massillon, O.
 Jones & Laughlin, Ltd., Pittsburgh, Pa.
 Saginaw Mfg. Co., Saginaw, Mich.
 Woods, T. B. Sons, Chambersburg, Pa.
- Pump Chains**
 Garland Chain Co., Rankin Station, Pa.
- Pumping Machinery**
 Cook, A. D., Lawrenceburg, Ind.
 Flier & Stowell Co., Milwaukee, Wis.
 Goulds Mfg. Co., Seneca Falls, N. Y.
 Ingersoll-Sergeant Drill Co., 36 Cortlandt St., N. Y.
 Lake City Engineering Co., Erie, Pa.
 McGowan, J. H. & Co., Cincinnati, O.
 Southwark Fdry. & Mch. Co., Phila.
- Pumps**
 Athol Pump Co., Athol, Mass.
 Barnes Mfg. Co., Mansfield, O.
 Deming Co., Salem, O.
 Edison Mfg. Co., Boston, Mass.
 Flint & Walling Co., Kendallville, Ind.
 Goulds Mfg. Co., Seneca Falls, N. Y.
 Hess, Snyder & Co., Massillon, O.
 Humphries Mfg. Co., Mansfield, O.
 Myers, F. E. & Bro., Ashland, Ohio.
 Red Jacket Mfg. Co., Davenport, Ia.
 St. Joseph Pump & Mfg. Co., St. Joseph, Mo.
 Wilder, S. & Co., Holliston, Mass.
- Punches, Conductors**
 Woodman, R. Mfg. & Supply Co., Boston, Mass.
- Punches and Shears, Hand and Power**
 Bethlehem Foundry & Machine Co., So. Bethlehem, Pa.
 Bicknell Hdw. Co., Jacksonville, Wis.
 Bliss, E. W. Co., Brooklyn, N. Y.
 Hilles & Jones Co., Wilmington, Del.
 Mersick, C. S. & Co., New Haven, Conn.
 New Doty Mfg. Co., Janesville, Wis.
 Williams, White & Co., Moline, Ill.
- Punching and Shearing**
 Harrington & King Perforating Co., Chicago, Ill.
- Push Carts**
 Syracuse Chilled Plow Co., Syracuse.
- Pyrometers**
 Uehling, Steinbart & Co. Ltd., Carlsbad, N. J.
- Railways, Industrial**
 Hunt, O. W. Co., West New Brighton, N. Y.
- Rat and Mouse Traps**
 Burditt & Williams, Boston, Mass.
- Ratchet Drills**
 Keystone Mfg. Co., Buffalo, N. Y.
- Razors**
 Buck Bros., Millbury, Mass.
- Razor Honers**
 Pike Mfg. Co., Pike Station, N. H.
- Reamers**
 Morse Twist Drill & Mch. Co., New Bedford, Mass.

Smoke Snacks
Lindsay, W. W. & Co., Phila., Pa.
Oney & Arrin, 36 Dey St., N. Y.

Soapstone Goods
Pike Mfg. Co., Pike Station, N. H.

Soapstone Pencils
Steward, D. M. Mfg. Co., Chattanooga, Tenn.

Soldering Copper Handles
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Soldering Coppers
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Speaking Tubes
Ostrander, W. R. & Co., 204 Fulton St.

Specialty Manufacturers
Franklin, H. H. Mfg. Co., Syracuse, N. Y.
Smith & Egge Mfg. Co., Bridgeport, Ct.

Spelter
Illinois Zinc Co., Peru, Ill.
Matthiessen & Hegeler Zinc Co., La Salle, Ill.

Spelter Solder
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Snakes
American Iron & Steel Mfg. Co., Lebanon, Pa.

Spoons and Forks
International Silver Co., Meriden, Ct.

Sporting Goods
Daine, Stoddard & Co., Boston, Mass.

Spray Pumps—(See Pumps)

Springs
American Steel & Wire Co., Chicago, Ill.
Barnes, Wallace Co., Bristol, Conn.
Cary Spring Works, 240 W. 29th St., N. Y.
Challion, John & Sons, 85-59 Cliff St., New York.
Clark & Cowles, Plainville, Conn.
Dunbar Bros., Bristol, Conn.
Miller & Van Winkle, Brooklyn, N. Y.
Morgan Spring Co., Worcester, Mass.
Sabin Machine Co., Montpelier, Vt.
Thas, Spring Co., Phila., Pa.
Welch, T. F. Mfg. Co., Boston, Mass.

Springs, Wagon, Etc.
Winters, F. W. & Co., Brooklyn, N. Y.

Spring Cutters
Winters, F. W. & Co., Chester, Conn.
Hollinger Fence Co., Greenville, O.

Spring Hinges
Rommers Bros., Brooklyn, N. Y.
Chicago Spring Butt Co., Chicago, Ill.
Van Wagoner & Williams Hdw. Co., Cleveland, O.

Sprocket Chain
Buhl Malleable Co., Detroit, Mich.

Spruce Cutters, Foot and Power
Shuster F. B. Co., New Haven, Conn.

Stacks
Scaife, Wm. B. & Sons, Pittsburgh.

Stamped Ware
Jenkinson, R. C. & Co., Newark, N. J.
Keen & Hagerty, Mfg. Co., Baltimore.
New York Stamping Co., Brooklyn, N. Y.

Stamping, Sheet Metal
American Hdw. Mfg. Co., Ottawa, Ills.
American Railway Supply Co., 24 Park St., N. Y.
An American Steel Scraper Co., Sidney, O.
Cleveland Stamping & Tool Co., Cleveland, Ohio.
Davis & Buxton Stamping Co., Worcester, Mass.
Goodwin & Kintz Co., Winsted, Conn.
Houghton & Buxton Mfg. Co., Worcester, Mass.
Jenkinson, R. C. & Co., Newark, N. J.
Kingslake, E. & Bro., Cleveland, Ohio.
Mossberg, Frank Co., Allegheno, Mass.
Reed & Curtis Mch. Screw Co., Worcester, Mass.
Terling Hinge Co., Wheeling, W. Va.
Wilson & Smith, Worcester, Mass.

Staple Machines, Automatic
Shuster, F. B. Co., New Haven, Conn.

Staples and Double Pointed Tacks
Grand Crossing Tack Co., Grand Crossing, Ill.
Milwaukee Tack Co., Milwaukee, Wis.
Titchener, E. H. & Co., Binghamton, N. Y.

Steak Knife
Wallingford Mfg. Co., Wallingford, Vt.

Steam Hammers
Dienelt & Eisenhardt, Philadelphia.
Dudgeon, Richard, 24 Columbia St., N. Y.
Fitchburg Shear Knife & Mach. Co., Pittsburg, Pa.
Sellers, Wm. & Co., Inc., Phila., Pa.

Steam Heating
Webster, Warren & Co., Camden, N. J.

Steam Separators
Harrison Safety Boiler Wks., Phila., Pa.
Webster, Warren & Co., Camden.

Steam Shovels
The Automatic Shovel Co., Lorain, O.

Steam Specialties
Crane Co., Chicago, Ill.
Crosby Steam Gauge & Valve Co., Boston.
Lunkenheimer Co., Cincinnati, O.
Mason Regulator Co., Boston, Mass.

Steam and Gas Fitters' Tools
Crane Co., Chicago.
Pittsburgh Valve, Foundry & Construction Co., Pittsburgh, Pa.

Steel Buildings
American Bridge Co., 100 B'way, N. Y.
Boston Bridge Works, Boston, Mass.
New England Structural Co., Boston, Mass.
Riser-Conley Mfg. Co., Pittsburgh, Pa.
Scaife, Wm. B. & Sons, Pittsburgh, Pa.

Steel Chimneys
Lindsay, W. W. & Co., Phila., Pa.

Steel, Cold Rolled Strip
Wilnot & Hobbs Mfg. Co., Bridgeport.
Wolf, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.

Steel Forgings and Castings
Bethlehem Steel Co., So. Bethlehem, Pa.

Steel Hoops
American Steel Hoop Co., Battery Park Building, N. Y.

Steel Importers

Hobson, Houghton & Co., 98 John St. N. Y.
Jensop, Wm. & Sons, Sheffield, England, or 91 John St., N. Y.
Milne, A. & Co., 1 Broadway, N. Y.
Wheelock, Lovejoy & Co., New York and Boston.

Steel (Mushet's Special)

Jonas, B. M. & Co., Boston.

Steel Manufacturers

American Steel Hoop Co., Battery Park Building, N. Y.
American Steel & Wire Co., Chicago, Ill.
Baker, Hermann & Co., 105 Duane St., New York.
Braeburn Steel Co., Braeburn, Pa.
Canton Steel Co., Canton, Ohio.
Champion Iron & Steel Co., Muskegon, Mich.
Chester Steel Castings Co., Ph. a., Pa.
Chrome Steel Works, Brooklyn, N. Y.
Crescent Steel Co., Pittsburgh, Pa.
Frankford Steel Co., Philadelphia.
Hobson, Houghton & Co., 98 John St., N. Y.

Jensop, Wm. & Sons, Sheffield, England, or 91 John St., New York.
Jones & Laughlin, Ltd., Pittsburgh, Pa.
Kidd Bros. & Ragner Steel Wire Co., McKees Rocks, Pa.

La Belle Steel Co., Pittsburgh, Pa.
Lorain Steel Co., Lorain, Ohio.
Luzerne Iron & Steel Co., Coatesville, Pa.
Nash, Geo. & Co., Chicago.

National Steel Co., Battery Park Building, N. Y.
Newkirk, J. B. & Co., Philadelphia, Pa.
Otis Steel Co., Ltd., Cleveland, Ohio.
Republic Iron & Steel Co., Chicago, Ill.
Rowland, Wm. & Harvey, Frankford, Philadelphia.

Singer, Nimick & Co., Inc., Pittsburgh.
Wardlow, S. & Co., Sheffield, England.
Wilcox & Hobbs Mfg. Co., Bridgeport, Conn.

Ogden & Wallace, 577-583 Greenwich St., New York.
Snyder, W. P. & Co., Pittsburgh, Pa.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.

Virginia Iron, Coal and Coke Co., Bristol, Va.—Tenn.

Steel, Self Hardening
Denman & Davis, 85-87 John St., N. Y.

Steel Rails
Lorain Steel Co., Lorain, Ohio.

Steel Stamps and Stencil Dies
Rucker, L. A. Stamp Wks., Little Ferry, N. J.

Ness, Geo. M., Jr., 61 Fulton St., N. Y.
Schwerdtle & Siebert, Bridgeport, Conn.

Steel, Tool
Braeburn Steel Co., Braeburn, Pa.
Canon Steel Co., Canton, Ohio.
Crescent Steel Co., Pittsburgh, Pa.
Denman & Davis, 85-87 John St., N. Y.
Frankford Steel Co., Philadelphia, Pa.
Jensop, Wm. & Sons, Sheffield, England, or 91 John St., N. Y.

Jonas, B. M. & Co., Boston, Mass.
La Belle Steel Co., Pittsburgh, Pa.
Nash, Geo. & Co., Chicago.
Singer, Nimick & Co., Pittsburgh, Pa.

Steel Ladders, Rolling
Bicycle Step Ladder Co., Chicago, Ill.
Coburn Trolley Track Mfg. Co., Holbrook, Mass.

Milbradt, G. A. & Co., St. Louis, Mo.
Morley Bros., Saginaw, Mich.

Stocks and Dies
Armstrong Mfg. Co., Bridgeport, Conn.
Card, S. W. Mfg. Co., Mansfield, Mass.
Curtis & Curtis, Bridgeport, Conn.
Fairbanks Co., 311 Broadway, N. Y.
Hollands Mfg. Co., Erie, Pa.
Jones & Lamson Mch. Co., Springfield, Vt.

Jaeger Mfg. Co., Erie, Pa.
Saunders' Sons, D., Yonkers, N. Y.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.

Stone Cutting Machinery
Gilmour, J., Bennett Bldg., N. Y.

Stone Working Machinery
Patch, F. K. Mfg. Co., Rutland, Vt.

Stop Screws
Read, A. P. & Co., Chicago, Ill.

Store Fixtures
Warren, J. M. Mfg. Co., Chicago, Ill.

Storm Window Fasteners
Woodruff, W. W. & Sons, Mt. Carmel, Ct.

Stove Linings
Graham Fire Brick Co., Troy, N. Y.

Stove Pipe Thimbles
Cheser, S. & Son, Manlius, N. Y.

Stove Trucks
Arcade Mfg. Co., Freeport, Ill.

Stoves, Oil, Vapor and Gasoline
Novelties Mfg. Co., Jackson, Mich.
Schneider & Trenkamp Co., Cleveland, Ohio.

Straightening Machines, Wire and Sheet Metal
Shuster, F. B. Co., New Haven, Conn.

Structural Iron and Steel Work
American Bridge Co., 100 B'way, N. Y.
Boston Bridge Works, Boston, Mass.
Du Bois Iron Works, Du Bois, Pa.
Eastern Bldg. & Structural Co., Worcester, Mass.
Forest City Steel & Iron Co., Cleveland, Ohio.

Illinois Steel Co., Chicago, Ill.
Moseley Iron Bridge & Roof Co., 30 Cortland St., N. Y.

New England Structural Co., Boston, Mass.
Phoenix Iron Co., Philadelphia, Pa.
Ritter-Conley Mfg. Co., Pittsburgh, Pa.
Stewart Iron Works, Cincinnati, Ohio.
West Side Foundry Co., Troy, N. Y.

Sulphuric Acid
Mathiesen & Heiser Zinc Co., La Salle, Ill.

Synthetic Machine
Excelior Needle Co., Torrington, Ct.

Table Ware
International Silver Co., Meriden, Ct.

Tacks, Brads, &c.
Diamond Tack & Nail Works, Raynham, Mass.
Grand Crossing Tack Co., Grand Crossing, Ill.

Milwaukee Tack Co., Milwaukee, Wis.
Plymouth Mills, Plymouth, Mass.
Hipple & Bartlett, Plymouth, Mass.
Shelton Co., Birmingham, Conn.

Tack and Nail Machinery

Kimball Bros. & Sprague, Brockton, Sweetser, W. A., Brockton, Mass.

Tanks, Iron and Steel
Clarendon Boiler Wks., No. Clarendon, Pa.
Olney & Warrin, 88 Dey St., N. Y.
Scaife, Wm. B. & Sons, Pittsburgh, Pa.

Tapes
Lufkin Rule Co., Saginaw, Mich.

Tap Holder
Ideal Machine Works, Hartford, Conn.

Tapping Machines
H. Bell, Harvey, Bridgeport, Conn.

Taps and Dies
Booley, C. H. & Co., Catago, Ill.
Butterfield & Co., Derby Line, Vt.
Card, S. W. Mfg. Co., Mansfield, Mass.
Reece, E. F. Co., Greenfield, Mass.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.

Telephones
Rawson Electric Co., Elyria, Ohio.

Terne Plate
American Tin Plate Co., N. Y.

Thimble Skeins
Mitchell, W. B., Chicago, Ill.

Time Recorders
Chicago Time Register Co., Chicago, Ill.
Cleveland Register Co., Oberlin, O.
Nash, C. & Co., 127 Duane St., N. Y.
Simplex Time Recorder Co., Gardner, Mass.

Waggoner Watchman Clock Co., Grand Rapids, Mich.

Tin Mills
Philadelphia Roll & Mch. Co., Phila., Pa.
Phillips, F. B. & Sons Co., Phila., Pa.

Tinners' Tools and Machines
Niagara Machine & Tool Works, Buffalo.

Tin Plate
American Tin Plate Co., N. Y.
Champion Iron & Steel Co., Muskegon, Mich.

Tin Plate Machinery
Lyord Booth Co., Youngstown, Ohio.

Tinware
Keen & Hagerty, Baltimore, Md.

Tinware Machinery
Shuster, F. B. Co., New Haven, Conn.

Tobin Bronze
Ansonia Brass & Copper Co., 99 John St., N. Y.

Toe Calks
Leonhardt & Co., Berlin, Schöneberg, Germany.

Toe Calks, Steel
Burke, F. F., Boston, Mass.

Tool Chests
Am. Tool Chest Co., 300 W. Houston St., New York.
Bliss, R. Mfg. Co., Fawcett, R. I.

Tool Grinders
Barney, E. F. Co., Rockford, Ill.
Seiders, Wm. & Co., Inc., Phila., Pa.
Union Mfg. Co., Buffalo, N. Y.

Tool Holders
Armstrong Bros. Tool Co., Chicago.
Hill Tool Co., Anderson, Ind.
Hogson & Pettis Mfg. Co., New Haven, Conn.

Tools
Athol Machine Co., Athol, Mass.
Brown, R. H. & Co., New Haven, Conn.
Goodell Pratt Co., Greenfield, Mass.
Mayhew, B. H. Co., Shelburne Falls, Mass.
Mullers Falls Co., 28 Warren St., N. Y.
Springfield Machine Screw Co., Springfield, Mass.

Stanley Rule & Level Co., 39 Chambers St., New York.
Stearns, L. S. Co., Athol, Mass.
Stevens, J. Arms & Tool Co., Chicopee, Mass.

Tools, Blacksmith and Wheelwright
Champion Blower & Forge Co., Lancaster, Pa.
Wiley & Russell Mfg. Co., Greenfield, Mass.

Tools, Steam and Gas Fitters'
Saunders' Sons, D., Yonkers, N. Y.

Torches, Oil and Gasoline
Schneider & Trenkamp Co., Cleveland, O.

Transom Openers
Ormsby, R. A., Melrose, Mass.

Tree Guards
Hartman Mfg. Co., 309 Broadway, N. Y.
Up-to-date Mfg. Co., Terre Haute, Ind.

Trolleys
Rox, Alfred & Co., Philadelphia, Pa.

Trowels
Bishop, Geo. H. & Co., Cincinnati, O.
National Saw Co., Newark, N. J.

Trucks
Boston & Lockport Block Co., Lockport.
Fairbanks Co., 311 Broadway, N. Y.
Kilbourne & Jacobs Mfg. Co., Columbus, Syracuse Chilled Plow Co., Syracuse, N. Y.

Variety Machine Co., Warsaw, N. Y.

Tab Hoops
Oatman Bros., Medina, Ohio.

Tube Expanders
Henderson, J. I. Sons, Wilmington, Del.

Tubes, Seamless Drawn Copper, Brass and Bronze
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Randolph-Cloves Co., Waterbury, Conn.

Tubing, Brass
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Phoenix Tube Co., Brooklyn, N. Y.
Spofford, W. S. & Son, Providence, R. I.

Tubing, Flexible Metallic
Sherr, Klump & Sisson Co., Chicago.

Tubing, Iron
Phoenix Tube Co., Brooklyn, N. Y.

Tubing, Steel
Heit Transmission Co., Danbury, Ct.
Janney, Stellmetts & Co., Phila., Pa.
Lene's John & Son & Co., Fletcher St.
National Tube Co., Pittsburgh, Pa.
Wilcox & Hobbs Mfg. Co., Bridgeport, Conn.

Tumbling Barrels
Henderson Bros., Waterbury, Conn.

Turbines
Cleveland City Forge & Iron Co., Cleveland, O.
Merrill Bros., 465 Kent Ave., B'klyn.

Twist Drills
Cleveland Twist Drill Co., Cleveland.
Morse Twist Drill & Machine Co., New Bedford, Mass.

New Process Twist Drill Co., Taunton, Mass.
Slocomb, J. T. & Co., Providence, R. I.
Standard Tool Co., Cleveland, O.

Twist Drill Grinders
Heald, L. S. & Son, Barre, Mass.
Washburn Shops of Worcester Polytechnic Inst., Worcester, Mass.
Wilmarth & Norman, Grand Rapids, Mich.

Union Couplings
Dart, E. M. Mfg. Co., Providence, R. I.

Upholsterers' Hardware
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Valves, Gas, Water and Steam
Ashton Valve Co., Boston, Mass.
Best Mfg. Co., Pittsburgh, Pa.
Chapman Valve Mfg. Co., Boston.
Crane Co., Chicago, Ill.
Crosby Steam Gate & Valve Co., Boston.
Jenkins Bros., 71 John, N. Y.
Kennedy Valve Mfg. Co., 75 John St., N. Y.

Lankenhofner Co., Cincinnati, O.
McNab & Harlin Mfg. Co., 58 John, N. Y.
Mason Regulator Co., Boston, Mass.
Pittsburgh Valve, Foundry & Construction Co., Pittsburgh, Pa.
Wood, R. D. & Co., Philadelphia, Pa.

Varnish
Standard Varnish Wks., 9 Broadway, N. Y.

Vegetable Slicers
Streeter, N. R. & Co., Rochester, N. Y.

Ventilating Fans
American Blower Co., Detroit, Mich.
Bayley, Wm. & Sons Co., Milwaukee, Wis.
Boston Blower Co., Hyde Park, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Exter Machine Wks., Boston, Mass.

Ventilating System
Ormsby, C. A., Melrose, Mass.
Ford, Ill.

Ventilator Appliances
Howard & Morse, 45 Fulton St., N. Y.

Ventilators
Drouve, G. O., Bridgeport, Conn.

Ventilator Openers
Ormsby, E. A., Melrose, Mass.

Vices
Athol Machine Co., Athol, Mass.
Bignall & Keeler Mfg. Co., Edwardsville, Ill.
Hollands Mfg. Co., Erie, Pa.
Howard Iron Works, Buffalo, N. Y.
Lewis Tool Co., 44 Barclay St., N. Y.
Massey Vice Co., Chicago, Ill.
Parker, Chas. Co., Meriden, Conn.
Prentiss Vice Co., 44 Barclay, N. Y.

Wagon Jacks
Covert Mfg. Co., West Troy, N. Y.
Covett's Saddlery Works, Farmer, N. Y.
Lane Bros. Co., Poughkeepsie, N. Y.

Washers
Hall's, Sam'l Sons 229 West 14th St., N. Y.
Haskell, Wm. H. Mfg. Co., Pawtucket, R. I.
Milton Mfg. Co., Milton, Pa.
Nix & Washburn Mfg. Co., Milwaukee, Wis.
Wilson & Smith, Worcester, Mass.

Washing Machines
Brammer, H. F. Mfg. Co., Davenport, Ia.
Chattanooga Washing Machine and Wringer Co., Chattanooga, Tenn.
Clark, Quen & Moore, Peoria, Ill.
Wayne, Anthony Mfg. Co., Ft. Wayne, Ind.

Watchman's Clocks
Nash, C. & Co., 127 Duane St., N. Y.
Waggoner Watchman Clock Co., Grand Rapids, Mich.

Water Gates
Kennedy Valve Mfg. Co., 75 John St., N. Y.

Water Wheels
Pools, Robt. & Son Co., Baltimore, Md.

Weeders
Clark, W. J. & Co., Salem, O.

Well Supplies
Cook, A. D., Lawrenceburg, Ind.

Wheelbarrows
American Steel Scraper Co., Sidney, O.
Kilbourne & Jacobs Mfg. Co., Columbus, Syracuse Chilled Plow Co., Syracuse, N. Y.

Wind Mills
Flint & Walling Co., Kendallville, Ind.

Window Cord
Samson Cordage Works, Boston, Mass.

Window Fasteners
Stanley Works, New Britain, Conn.

Window Frames, Metal
Smith-Warren Co., E. Cambridge, Mass.

Window Screens
Porter Screen Mfg. Co., Burlington, Vt.

Window Stop Adjusters
Ives, H. B. & Co., New Haven, Conn.

Window Weights
Barnet & Reed Mfg. Co., Boston, Mass.

Wire
Dillon-Griswold Wire Co., Sterling, Ill.
Grand Crossing Tack Co., Grand Crossing, Ill.
Kidd Bros. & Burgher Steel Wire Co., McKees Rocks, Pa.

Phillips & Van Winkle, Brooklyn, N. Y.
National Wire Co., New Haven, Ct.
Prentiss, Geo. W. & Co., Holyoke, Mass.
Reading Screw Co., Norristown, Pa.
Spencer Wire Co., Worcester, Mass.
Stewart Wire Co., Easton, Pa.
Summit Wire Co., Cuyahoga Falls, O.
Townsend, C. C. & E. F., New Brighton, Trenton Iron Co., Trenton, N. J.

Wolf, R. H. & Co., Ltd., 115th St. and Harlem River, N. Y.

Wright & Colton Wire Cloth Co., Worcester, Mass.

Wire Chains
Bridgeport Chain Co., Bridgeport, Ct.
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Onsida Community, Ltd., Niagara Falls, N. Y.

Wire Cloth
Barnum, E. T., Detroit, Mich.
Clinton Wire Cloth Co., Clinton, Mass.
Derby, Edward & Sons, Philadelphia.
Bester Wire Works Co., 65 Fulton St., New York.

Gilbert & Bennett Mfg. Co., 44 Cliff St., New York.

Howard & Morse, 45 Fulton St., N. Y.
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Ludlow Saylor Wire Co., St. Louis, Mo.
Michigan Wire Cloth Co., Detroit, Mich.
New Freedom Wire Cloth Co., New Freedom, Pa.

N. J. Wire Cloth Co., Trenton, N. J.
Schaefer's Sons, Buffalo, N. Y.
Tyler, W. S. Co., Cleveland, O.

W. K. Bros., Cortland, N. Y.
Wright & Colton Wire Cloth Co., Worcester, Mass.

Wire Cutters
Chandler & Farquhar, Boston, Mass.
King, J. M. & Co., Watertown, N. Y.

Wire Dies
McFarland, Wm., Trenton, N. J.

Wire Drawing Machinery
Morgan Construction Co., Worcester.
Mossberg & Granville Mfg. Co., Providence, R. I.

Wire Fences—(See Fencing, Iron and Wire.)

Wire Goods
Brooks, M. S. & Sons, Chester, Conn.
Darby, Edward & Sons, Philadelphia.
Gilbert & Bennett Mfg. Co., 44 Cliff St., New York.

Jenckes, E. Mfg. Co., Pawtucket, R. I.
Kilbourne Mfg. Co., Fair Haven, Vt.
Michigan Wire Cloth Co., Detroit, Mich.

Schaefer's Sons, Buffalo, N. Y.
Wickwire Bros., Cortland, N. Y.
Wire Goods Co., Worcester, Mass.

Wire Forming Machinery
Automatic Machine Co., Bridgeport, Ct.
Manville, E. J. Mch. Co., Waterbury, Ct.
Nilson, A. H. Mch. Co., Bridgeport, Ct.
Snustner, F. B. Co., New Haven, Conn.

Wire Mill Machinery
Braddock Mch. & Mfg. Co., Braddock, Pa.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

Wire Mats
Hartman Mfg. Co., 309 Broadway, N. Y.

Wire Nails
America Screw Co., Providence, R. I.
Dillon-Griswold Wire Co., Sterling, Ill.
Grand Crossing Tack Co., Grand Crossing, Ill.

National Wire Co., New Haven, Ct.
Summit Wire Co., Cuyahoga Falls, O.
Townsend, C. C. & E. F., New Brighton.

Wire Nail Machinery
Braddock Mch. & Mfg. Co., Braddock, Pa.

Miller, H. J., Bridgewater, Mass.
National Machinery Co., Tiffin, Ohio.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

Wire Parts
Jenkinson, R. C. & Co., Newark, N. J.

Wire Reels, Adjustable
Shuster, F. B. Co., New Haven, Conn.

Wire Rods, Steel
Consolidated Iron & Steel Co., Bristol, Pa.

National Wire Co., New Haven, Conn.
Nicol, A. & Co., 69-61 Wall St., N. Y.

Prentiss, Geo. W. & Co., Holyoke, Mass.
Spencer Wire Co., Worcester, Mass.
Wolf, R. H. & Co., Ltd., 115th Street and Harlem River, N. Y.

Wire Rope, Iron and Steel
American Steel & Wire Co., Chicago, Ill.
Broderick & Bascom Rope Co., St. Louis.
California Wire Works, San Francisco.
Hazard Mfg. Co., Wilkesbarre, Pa.

A. Leachen & Sons Rope Co., St. Louis.
Macomber & Whyte Rope Co., Chicago, Ill.

Trenton Iron Co., Trenton, N. J.
Waterbury Rope Co., 69 South St., N. Y.

Williamsport Wire Rope Co., Williamsport, Pa.

Wire Straightening and Cutting Machinery
Shuster, F. B. Co., New Haven, Conn.

Wood Hardware
Bliss, R. Mfg. Co., Pawtucket, R. I.

Wood Screw Machinery
Cook, A. S. & Co., Hartford, Conn.

Wood Trimmers
Fox Machine Co., Grand Rapids, Mich.

Wood Working Machinery
Defiance Mch. Works, Defiance, O.
Pay, J. A. & Egan Co., Cincinnati, O.

Seneca Falls Mfg. Co., Seneca Falls, N. Y.
Woods, S. A. Machine Co., So. Boston, Mass.

Wreckers
Chicago House Wrecking Co., Chicago, Ill.

Kennedy, L. E. & Co., 95 Liberty St., N. Y.

Wrenches
Atlas Pipe Wrench Co., 121 Liberty St., N. Y.

Belden Machine Co., New Haven, Conn.
Bemis & Call Hdwr. & Tool Co., Springfield, Mass.

Coxe Wrench Co., Worcester, Mass.
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

We
Wish
You
a
Happy
and
Prosperous
New Year.

Iver Johnson's
Arms & Cycle
Works,
FITCHBURG,
MASS.

BRANCHES:
New York, 99 Chambers St.
Boston, 105 Washington St.
Worcester, 364 Main St.

A 20th Century Proposition.

A great many hardware dealers sell guns and revolvers and find it profitable. They are the progressive ones.

If you do not, why not start the New Year by putting in a line? You're in the business for the profit in it, of course.

Iver Johnson

Guns and Revolvers

are

Profitable Hardware

They are well known for their safety features and the Iver Johnson Safety Automatic Revolver is the one most generally used for

Police, House, or Pocket Use.

Have you ever stopped to think how easy it would be to sell Fire-arms? Bicycles, too, are sold by many dealers.

The Iver Johnson Bicycle is known far and near as

An Honest Cycle at an Honest Price.

SEND FOR CATALOGUES.

ROBT. WETHERILL & Co.,

CHESTER, PA.

Manufacturers

Corliss Engines,

BERRY SAFETY

BOILERS.

CLARK & PARSONS CO.,
East Wilton, Maine, U. S. A.

NEW LINE

Hay
Corn
Broad **KNIVES.**

Send for Circulars.
WIEBUSCH & HILGER, Ltd., N. Y.,
Sole Agents for U. S. and Canada.

2 IN 1

Nail Puller

AND

Band Cutter.

HARDWARE SPECIALTIES,
L. T. SNOW
MANUFACTURER
NEW HAVEN CONN.

BEST BOX OPENER
ON EARTH.

PICTURE MOULDING HOOKS,
BRASS CUP and SHOULDER HOOKS.
PICTURE NAILS and KNOBS,
CURTAIN and SCREW RINGS.

OSSAWAN MILLS CO., - Norwich, Ct.



Bradley Shelf Brackets,

Strong, Light and All Right.

ATLAS MFG. CO., New Haven, Ct., U.S.A.

Hill Clothes Dryer.

More than

100,000

in use, pleasing everybody.
Both yard and balcony
Dryers.

Fold them up without removing clothes-line and
take indoors when not in use.

Ask your Hardware dealer about them or send for Il-
lustrated Catalogue giving full description and prices.

HILL DRYER COMPANY, Worcester, Mass.

Republic Iron & Steel Co.,

CHICAGO.

MANUFACTURERS

BAR IRON. BAR STEEL.

PIG IRON.

MACHINE BOLTS.
CARRIAGE BOLTS.
GIMLET POINT COACH SCREWS

TURNBUCKLES.

R. R. SPIKES.

Sales Offices :

New York,

Cleveland,

St. Louis,

Buffalo,

Cincinnati,

St. Paul,

Birmingham,

San Francisco,

Butte, Mont.

FITCH SASH LOCKS

Send for
Catalog



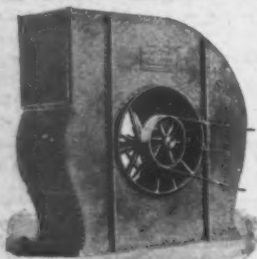
SATISFY

BUILDERS,
USERS,
DEALERS.

MANUFACTURED BY
THE W. & E. T. FITCH CO., New Haven, Ct.

Reeves
"Tubal" Bronze
Strong as Steel
Write for Prices
and
Physical Tests.
Paul S. Reeves & Son
Philadelphia, Pa. U.S.A.

BUFFALO FANS



For
 Heating,
 Ventilating,
 Drying,
 Mechanical
 Draft,
 etc.

CATALOGUE

BUFFALO FORGE COMPANY, Buffalo, N.Y., U.S.A.

STEEL TUBES

WELDLESS
 COLD DRAWN
 SMOOTH INSIDE AND OUT
 JOHN S. LENG'S SON & CO., NEW YORK.

Diamond Tools.

The Tanite Co.,
 Stroudsburg, Pa.

MILLER & VAN WINKLE
STEEL WIRE AND STEEL SPRINGS
 TEMPERED COMPRESSION & EXTENSION SPRINGS
 A SPECIALTY.
 OFFICE & WORKS 18-24 BRIDGE ST. BROOKLYN, N.Y.



"WILLIS SAP SPOUT"

"In one piece, with hook.
 "made from Tinned Metal
 "tenable Iron. Will not
 "break. Far superior to
 "all others. Send for circular of
 "Maple sugar goods."
 "CHAR. MILLER & SON CO., Utica, N.Y."

SPENCER AUTOMATIC MACHINE SCREW CO.



HARTFORD, CONN.

BOMMER SPRING HINGES



ARE THE BEST.

"PRACTICALLY
 UNBREAKABLE"

SAYS THE WORLD'S FAIR AWARD

BOMMER BROTHERS,
 Factory, 287-291 Cleason Ave.,
 BROOKLYN, N. Y.

SMALL STEEL CASTINGS

Manufactured by
 Stanley G. Flagg & Co., Philadelphia, Pa.

Butcher Saws.

See Page 98

MILLERS FALLS CO.,
 28 Warren St., New York.

Springs and Axles ROLLING MILL.

F. W. Wurster & Co.,
 375 Kent Ave., - Brooklyn, N. Y.



"Green River"
 Graduated Tire Measuring
 Wheel.

A Drop Forging. Raised Figures.
 SEND FOR CATALOGUE.

Wiley & Russell Mfg Co., Greenfield, Mass. U.S.A.

LIDGERWOOD HOISTING ENGINES.

The STANDARD For QUALITY
 and DUTY.
 LIDGERWOOD MFG. CO., 96 Liberty St., N. Y.

ESTABLISHED
 Spring Making, 1842. Steel Making, 1845
 Norway Iron, 1871 (Re-Rolled).

WM. & HARVEY ROWLAND.

MANUFACTURERS OF

Springs, Steel, Re-Rolled Norway
 Iron & Silt Norway Nail Rods.

Address FRANKFORD P. O., PHILADELPHIA.

IRON PATTERN GEARS
 WITH ACCURATE ALLOWANCE
 FOR SHRINKAGE.
 GLEASON TOOL CO. ROCHESTER, N.Y.

BESIDES "KENNEDY" GATES



WE MAKE
 GLOBE, ANGLE
 and RADIATOR
 ALSO
 SWING CHECK
 VALVES.
 All of a superior
 quality.



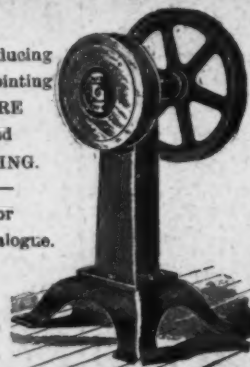
THE KENNEDY VALVE MFG. CO.,
 38 Beekman St., New York.

JOHN SOMMER'S SON
 MAKES THEM.
 THEY ARE
 MADE OF
 SELECTED
 ROCK MARBLE
 BOILED IN PURE
 LINSEED OIL
 OUR
 MALTRE
 CROSS
 IS ALWAYS
 STAMPED
 IN THE
 WOOD
 OF THE
 HANDLE
 IXL FAUCETS.
 353 CENTRAL AVE., NEWARK, N. J.

Dayton Swaging Machines

for reducing
 and pointing
 WIRE
 and
 TUBING.

Send for
 Catalogue.



Tapering
 and
 Pointing
 and all kinds
 of
 Reducing.

also Manu-
 facturers
 of
 MACHINE
 NEEDLES
 of all kinds.

EXCELSIOR NEEDLE CO., Torrington, Conn.



CHARLES H. BESLY & CO.
 FINE TOOLS & SUPPLIES FOR METAL WORKERS
 10 & 12
 N. CANAL ST.
 CHICAGO, ILL. U.S.A.



Pneumatic and Hand Power
TRAVELING CRANES.
 Chain Hoists.

MALLEABLE IRON CASTINGS.
 THE CHISHOLM & MOORE MFG. CO.,
 CLEVELAND, OHIO.

Twenty Years
 of Success!

GEM
 SPRING
 HINGES.

Write for our catalogue.

Van Wagoner & Williams
 Hardware Co.,

Cleveland, O., and New York, U. S. A.

SUPPLEMENT TO THE IRON AGE,
DECEMBER 27, 1900.

THE Consolidations and Listed
Stock Companies in the Iron
and Allied Trades.

DAVID WILLIAMS CO.
202-232 WILSON ST.
N. Y. & NEW YORK & N. Y.



SUPPLEMENT TO THE IRON AGE,
DECEMBER 27, 1900.

THE Consolidations and Listed Stock Companies in the Iron and Allied Trades.

DAVID WILLIAMS CO.,
232-238 William Street,
♦ ♦ ♦ NEW YORK ♦ ♦ ♦

Ala
Am
— Am
Am
Am
Am
— Am
Am
Am
— Am
— Am
— Am
Bet
Can
— Can
Cer
Col
Cru
Dia
En
— Fe
Int
Int

INDEX.

	PAGE.		PAGE.
Alabama Consolidated Coal & Iron Company.....	5	International Steam Pump Company.....	30
American Bicycle Company.....	5	Magnus Metal Company.....	31
American Bridge Company.....	8	National Enameling & Stamping Company.....	32
American Car & Foundry Company.....	9	National Steel Company.....	33
American Iron & Steel Mfg. Company.....	10	National Tube Company.....	34
American Radiator Company.....	10	New Haven Iron & Steel Company.....	35
American Sheet Steel Company.....	11	Niles-Bement-Pond Company.....	36
American Shipbuilding Company.....	12	Pressed Steel Car Company.....	37
American Smelting & Refining Company.....	13	Pittsburgh Stove & Range Company.....	37
American Steel Hoop Company.....	14	Pittsburgh Valve, Foundry & Construction Company.....	38
American Steel & Wire Company.....	15	Republic Iron & Steel Company.....	38
American Tin Plate Company.....	18	Shelby Steel Tube Company.....	40
Bethlehem Steel Company.....	19	Sloss-Sheffield Steel & Iron Company.....	41
Cambria Steel Company.....	20	Standard Chain Company.....	42
Carnegie Company.....	21	Standard Sanitary Mfg. Company.....	43
Central Foundry Company.....	22	Susquehanna Iron & Steel Company.....	43
Colorado Fuel & Iron Company.....	23	Tennessee Coal, Iron & Railroad Company.....	44
Crucible Steel Company of America.....	24	Thomas Iron Company.....	47
Diamond State Steel Company.....	25	United States Cast Iron Pipe & Foundry Company...	47
Empire Steel & Iron Company.....	25	United States Projectile Company.....	48
Federal Steel Company.....	26	Virginia Iron, Coal & Coke Company.....	49
International Heater Company.....	29	Warwick Iron & Steel Company.....	50
International Silver Company.....	29		

Index of Constituent Companies, see page 51.

Alabama Consolidated Coal & Iron Company.

Title:

Alabama Consolidated Coal & Iron Company.

Date of Organization:

July 19, 1899.

Capital Stock Authorized:

Preferred (7 per cent., cumulative).....\$2,500,000
Common (par, \$100).....\$2,500,000

Capital Stock Issued:

Preferred\$2,500,000
Common\$2,500,000

Bonded Indebtedness:

None.

Dividends Declared and Dates Thereof:

ON PREFERRED STOCK.

No. 1, November 1, 1899, 1¼ per cent.
No. 2, February 1, 1900, 1¼ per cent.
No. 3, May 1, 1900, 1¼ per cent.
No. 4, August 1, 1900, 1¼ per cent.
No. 5, November 1, 1900, 1¼ per cent.

Registrar of Stock:

International Trust Company, Baltimore, Md.

Transfer Agents:

International Trust Company, Baltimore, Md.

Properties and Plants Owned:

Clifton Iron Company, two blast furnaces at Iron-
ton, Ala.; 2500 acres mineral lands, 28,965 acres other
lands, containing valuable deposits, lime rock, &c.,
together with buildings for employees.

Gadsden Furnace and ore property, one furnace at
Gadsden, Ala., 2000 acres ore lands.

Mary Pratt Furnace property, one blast furnace at
Birmingham, Ala., 33 acres ore lands, &c.

Gate City ore property, 1800 acres ore lands near
Gate City, Ala., and about 6 miles from Birmingham.

Standard Coal Company, Tuscaloosa County, Ala.,
32,211 acres, 24,000 acres of which contain seams of
high grade coal.

Brown ore—Hematite property, Polk County, Ga.,
about 2000 acres.

Other coal lands not enumerated.

Products:

Iron, coal and coke.

Productive Capacity:

Iron—150,000 tons per year.

Coal—35,000 tons per month.

Coke—After completing 150 ovens under construction,
16,000 to 18,000 tons per month.

Headquarters:

Birmingham, Ala.

Board of Directors:

Abram S. Hewitt, New York.

John E. Searles, New York.

Samuel Thomas, New York.

J. W. Middendorf, Baltimore, Md.

R. H. Edmonds, Baltimore, Md.

Douglas H. Gordon, Baltimore, Md.

Summerfield Baldwin, Baltimore, Md.

T. G. Bush, Birmingham, Ala.

F. M. Jackson, Birmingham, Ala.

Executive Officers and Managers of Plants:

T. G. Bush, president, Birmingham, Ala.

Jno. E. Searles, vice-president, New York City.

Charles T. Westcott, secretary and treasurer, Balti-
more, Md.

F. M. Jackson, general manager, Birmingham, Ala.

Sales Agents:

Matthew Addy & Co., Cincinnati, St. Louis, New
York, Chicago and Philadelphia.

American Bicycle Company.

Title:

American Bicycle Company.

Date of Organization:

May 12, 1900, under laws of New Jersey.

Capital Stock Authorized:

\$80,000,000.

Capital Stock Issued:

Preferred (rate of interest, 7 per cent.,
cumulative)\$10,000,000
Common (par, \$100).....\$20,000,000

Bonded Indebtedness:

\$10,000,000 5 per cent. gold debentures, due Septem-
ber 1, 1919, but redeemable at the rate of \$250,000
per annum.

Dividends Declared and Dates Thereof:

ON PREFERRED STOCK.

None.

ON COMMON STOCK.

None.

Financial Statement:

STATEMENT OF CONDITION AUGUST 1, 1900.

QUICK CAPITAL.

Assets.	
Cash	\$1,072,881.84
Accounts and notes receivable.....	4,432,987.03
Investments in securities at actual value on August 1, 1900.....	4,004,700.00
(These investments produce an annual income of \$256,475.)	
Merchandise on hand, including fin- ished product, raw material and supplies	5,815,008.07
Unexpired insurance.....	44,537.70
Total quick assets.....	\$15,370,114.64

Liabilities.

Accounts and notes payable	\$3,280,619.64
Factory, bonds and mortgages:	
Previous to consolidation ...	\$198,457.22
Less paid since September 1, 1899	77,457.22
	<u>\$121,000.00</u>
	\$3,401,619.64
Net quick assets	<u>\$11,968,495.00</u>

BALANCE SHEET.

Assets.

Net quick assets	\$11,968,495.00
Plant investment:	
Per statement dated October 1, 1899	\$31,502,760.89
Less miscellaneous sales of factories and machinery closed out since October 1, 1899	334,745.61
	<u>\$31,168,015.28</u>
Less depreciation	1,168,015.28
	<u>30,000,000.00</u>
Total	\$41,968,495.00

Liabilities.

Debentures, 5 per cent., due September 1, 1919, in bonds of \$1000 each, at par	\$10,000,000
Preferred stock, cumulative, 7 per cent., in shares of \$100 each, at par	10,000,000
Common stock, in shares of \$100 each, at par ..	20,000,000
	<u>\$40,000,000.00</u>

Surplus Account.

Balance	\$1,362,915.29
Net profit, 10 months ending July 31, 1900, after paying interest on bonds	605,579.71
	<u>\$1,968,495.00</u>
Total	\$41,968,495.00

Registrar of Stock:

United States Mortgage & Trust Company, 59 Cedar street, New York.

Transfer Agents:

Baring, Magoun & Co., 15 Wall street, New York.

Properties and Plants:

Ames & Frost Company, Chicago.
 Acme Mfg. Company, Reading, Pa.
 Black Mfg. Company, Erie, Pa.
 Buffalo Cycle Mfg. Company, Buffalo.
 H. A. Christy & Co., New York City (including plants at Paris, France, and Walkersville, Canada).
 Crawford Mfg. Company, Hagerstown, Md.
 Cleveland Machine Screw Company, Cleveland, Ohio (steel ball and stamping department).
 A. Featherstone & Co., Chicago.
 Fay Mfg. Company, Elyria, Ohio.
 Gormully & Jeffery Mfg. Company, Chicago.
 Geneva Cycle Company, Geneva, Ohio.
 Hartford Cycle Company, Hartford, Conn.
 Hart & Cooley Mfg. Company, Chicago, Ill.
 Indiana Bicycle Company, Indianapolis.
 Indianapolis Chain & Stamping Company, Indianapolis.

H. A. Lozier & Co., Cleveland, Ohio (including plants at Toledo, Thompsonville and Westfield, Ohio).
 Lamb Mfg. Company, Chicopee Falls, Mass.
 A. D. Meiselbach, Milwaukee, Wis.
 Monarch Cycle Mfg. Company, Chicago.
 Nutall Mfg. Company, Nyack, N. Y.
 North Buffalo Wheel Company, Buffalo.
 Pope Mfg. Company, Hartford.
 Sterling Cycle Works, Kenosha, Wis.
 Shelby Cycle Mfg. Company, Shelby, Ohio.
 C. J. Smith & Sons Company, Milwaukee.
 E. C. Stearns & Co., Syracuse, N. Y. (including plant at Toronto, Ont.).
 Syracuse Cycle Company, Syracuse, N. Y.
 G. L. Thompson Mfg. Company, Chicago.
 Western Wheel Works, Chicago.
 White Sewing Machine Company, Cleveland, Ohio (bicycle and pedal departments).

Products:

Bicycles: Stormer, Pennant, Mars, Imperial, Barnes, Tribune, Envoy, Fleetwing, Columbus, Royal Flush, Oregon, Crawford, Our Little Ones, Fay, Williams, Featherstone, Geneva, Clipper, Rambler, Waverly, Ivanhoe, Spalding, Cleveland, Famous, Carnival, Earl, Meiselbach, Monarch, Defiance, Kings, Queens, Nyack, Niagara, Columbia, Hartford, Vedettes, Crescent, Sterling, Ideal, Stearns, Syracuse, Phoenix.

Automobiles: Electric, gasoline, steam.

Bicycle parts.

Bicycle equipments, etc.

Trimotos.

Motor tricycles.

Headquarters:

Park Row Building, New York.

Executive Committee:

R. L. Coleman.
 Albert A. Pope.
 George Pope.
 H. A. Lozier.
 G. F. Crane.

Board of Directors

Term ending October, 1901.

H. A. Lozier, Cleveland, Ohio.
 A. Featherstone, Chicago, Ill.
 R. S. Crawford, Hagerstown, Md.
 E. C. Stearns, Syracuse, N. Y.
 William Barbour, New York, N. Y.

Term ending October, 1902.

Albert G. Spalding, Seabright, N. J.
 Albert A. Pope, Cohasset, Mass.
 R. Lindsay Coleman, New York, N. Y.
 George Pope, New York, N. Y.

Term ending October, 1903.

George W. Young, New York, N. Y.
 Charles L. Ames, Chicago, Ill.
 J. W. Kiser, Chicago, Ill.
 Gardiner M. Lane, Boston, Mass.
 George F. Crane, New York, N. Y.

Executive Officers:

R. L. Coleman, president.
 Geo. Pope, vice-president.
 J. E. Bromley, second vice-president.
 Theo. F. Merseles, third vice-president.
 A. L. Garford, treasurer.
 C. W. Dickerson, secretary.
 W. T. Simpson, auditor.

Managers of Plants:

Ball and pedal factory, Cleveland, Ohio; W. L. Colt.
 Chain factory, Indianapolis, Ind.; L. M. Wainwright.
 Columbia factory, Hartford, Conn.; A. L. Pope.
 Crawford factory, Hagerstown, Md.; C. H. Carllie.
 Crescent factory, Chicago, Ill.; Otto Unzicker.

Featherstone factory, Chicago, Ill.; W. D. Gould.
 Monarch factory, Chicago, Ill.; W. J. Mead.
 Imperial factory, Chicago, Ill.; F. L. Bryant.
 Rambler factory, Chicago, Ill.; N. G. Harris.
 Reading factory, Reading, Pa.; J. C. Reber.
 Shelby factory, Shelby, Ohio; F. L. Smith.
 Smith parts factory, Milwaukee, Wis.; A. O. Smith.
 Steel factory, Chicago, Ill.; D. B. Marwick.
 Stearns factory, Syracuse, N. Y.; J. P. Devine.
 Thompson parts factory, Chicago, Ill.; G. L. Thompson.
 Toledo factory, Toledo, Ohio; A. Thompson.
 Tribune factory, Erie, Pa.; Geo. C. Russell.
 Waverly factory, Indianapolis, Ind.; C. L. Pepper.
 Westfield factory, Westfield, Mass.; C. J. Moore.

Sales Department :

Columbia Sales Department,
 Hartford, Conn.; A. L. Pope, manager.
 Rambler Sales Department,
 Chicago, Ill.; C. Van Horne, manager.
 Crescent Sales Department,
 Chicago, Ill.; E. J. Day, manager.
 Monarch Sales Department,
 Chicago, Ill.; O. C. Hutchinson, manager.
 Featherstone Sales Department,
 Chicago, Ill.; A. H. Bryant, manager.
 Cleveland Sales Department,
 Westfield, Mass., H. A. Lozler, Jr., manager.
 Crawford Sales Department,
 Hagerstown, Md., L. B. Whympier, manager.

Branches .*New York.*

Columbia Sales Department,
 New York Branch, 12 Warren street; Elliott
 Mason, manager.
 Crescent Sales Department,
 New York Branch, 36 Warren street; C. V. Tut-
 hill, manager.
 Rambler Sales Department,
 Retail Branch, 939 Eighth avenue; F. S. Ray,
 manager.
 Rambler Eastern Branch,
 941 Eighth avenue; C. S. Butler, manager.
 Monarch Sales Department,
 New York Branch, 20 Warren street; C. P.
 Adams, manager.
 Tinkham Company,
 306 West Fifty-ninth street; H. G. McKinlay,
 manager.
 Featherstone Sales Department,
 New York Branch, 48 Warren street; R. C.
 Rueschaw, manager.
 New York Branch, Automobile Department, 91
 and 93 Fifth avenue; C. J. Mudge, manager.

Brooklyn.

Rambler Retail Branch,
 Flatbush avenue; G. W. Bennett, manager.

Chicago, Ill.

Crescent Sales Department,
 Retail Branch, North side, 653 Clark street; J. T.
 Swarthout, manager.
 Rambler Retail Branch,
 128 Dearborn street; J. F. Gunther, manager.
 Cleveland Sales Department,
 Western office, corner Blackhawk street and
 Cherry avenue; C. E. Lozier, manager.

Boston, Mass.

Columbia Sales Department,
 Retail Branch, 221 Columbus avenue; J. A. Tay-
 lor, manager.

Washington, D. C.

Columbia Sales Department,
 Washington Branch, 817 Fourteenth street, N.
 W.; W. J. Foss, manager.
 Rambler Sales Department,
 Washington Branch, 1325 Fourteenth street, N.
 W.; J. C. Wood, manager.

San Francisco, Cal.

Columbia Sales Department,
 San Francisco Branch, 52 First street; P. H.
 Bernays, manager.
 Cleveland Sales Department,
 San Francisco Branch, 304 McAllister street; G.
 A. Morrill, manager.
 Stearns Sales Department,
 San Francisco Branch, 210 McAllister street; S.
 G. Chapman, manager.
 T. H. B. Varney,
 Rambler Agency, Market, Tenth and Stevenson
 streets.

Portland, Ore.

Columbia Sales Department,
 Portland Branch, 132-134 Sixth street; Henry
 Goodman, manager.
 F. T. Merrill Cycle Company,
 F. T. Merrill, manager.

Buffalo, N. Y.

Rambler Sales Department,
 Buffalo Branch, 509 Main street; Jas. H. Isham,
 manager.

Detroit, Mich.

Rambler Sales Department,
 Detroit Branch, Woodward avenue; G. H. Form-
 hals, manager.

Cleveland, Ohio.

Rambler Sales Department,
 Cleveland Branch, Erie street; H. A. Githens,
 manager.

Cincinnati, Ohio.

Rambler Sales Department,
 Cincinnati Branch, Main street; W. L. Smith,
 manager.

Providence, R. I.

Columbia Sales Department,
 Providence Branch, Snow street, Herbert E. Rice,
 manager.

Philadelphia, Pa.

Cleveland Sales Department,
 Philadelphia Branch, 830 Arch street; C. C. Hilde-
 brand, manager.
 Rambler Sales Department,
 Philadelphia Branch, 100 Arch street; W. J.
 Loomis, manager.

European Branches.

American Bicycle Company, Paris Branch,
 20 Bis, 22 and 22 Bis, Rue Gravel, Levallois-
 Perret, Paris, France.
 American Bicycle Company, London Branch,
 147-149 Farringdon road, London, E. C., England.
 American Bicycle Company, G. M. B. H.,
 Neuerwall 36, Hamburg, Germany.

Purchasing Agent:

J. C. Matlack, Park Row Building, New York.

American Bridge Company.

Title:

American Bridge Company.

Date of Organization:

May 15, 1900, under laws of New Jersey.

Capital Stock Authorized:

Preferred (7 per cent. cumulative).....\$35,000,000
Common (\$100 par).....\$35,000,000

Capital Stock Issued:

Preferred\$30,527,800
Common\$30,527,800

Bonded Indebtedness:

None.

Dividends Declared and Dates Thereof:

ON PREFERRED.

2% per cent., from May 15, 1900, to October 1, payable January 24, 1901.

ON COMMON.

None.

Financial Statement:

None issued to date.

Registrar of Stock:

Morton Trust Company of New York.

Transfer Agents:

American Bridge Company.

Properties and Plants Owned:

A. & P. Roberts Company (bridge works), Pencoyd, Pa.
New Jersey Steel & Iron Company, Trenton, N. J.
American Bridge Works, Chicago, Ill.
Berlin Iron Bridge Company, East Berlin, Conn.
Buffalo Bridge & Iron Works, Buffalo, N. Y.
Edge Moor Bridge Works, Edge Moor, Del.
Elmira Bridge Company, Limited, Elmira, N. Y.
Gillette-Herzog Mfg. Company, Minneapolis, Minn.
Groton Bridge Mfg. Company, Groton, N. Y.
Hilton Bridge Construction Company, North Albany, N. Y.
Horseheads Bridge Company, Horseheads, N. Y.
Keystone Bridge Works, Carnegie Steel Company, Pittsburgh, Pa.
Lafayette Bridge Company, Lafayette, Ind.
Lessig Bridge & Iron Works, Lake View, Chicago, Ill.
J. G. Wagner Company, Milwaukee, Wis.
New Columbus Bridge Company, Columbus, Ohio.
Pittsburgh Bridge Company, Pittsburgh, Pa.
Post & McCord, Greenpoint, L. I., N. Y.
Rochester Bridge Iron Works, Rochester, N. Y.
Schultz Bridge & Iron Company, McKee's Rocks, Pa.
Shiffler Bridge Company, Pittsburgh, Pa.
Union Bridge Company, Athens, Pa.
Wrought Iron Bridge Company, South Canton, Ohio.
Youngstown Bridge Company, Youngstown, Ohio.

Products:

Bridges.
Roofs.
Buildings.
Columns, roofs and all metal structures.

Productive Capacity:

600,000 tons per annum.

Improvements or Additions Under Way:

Consolidation of plants in the Pittsburgh district.

Office:

100 Broadway, New York.

Executive Committee:

Percival Roberts, Jr., president.
William H. Connell.

Charles Macdonald.

W. H. McCord.

Charles M. Jarvis.

Frank Conger.

James P. Kennedy.

Finance Committee:

Percival Roberts, Jr.

William H. Connell.

W. G. Oakman.

Charles Steele.

Robert Bacon.

Board of Directors:

Percival Roberts, Jr.

Albert C. Case.

William H. McCord.

Charles M. Jarvis.

William H. Connell.

Walter Hawxhurst.

Charles Macdonald.

Frank Conger.

James P. Kennedy.

Lewis S. Gillette.

John F. Alden.

Walter G. Oakman.

J. P. Ord.

Robert Winsor.

Robert Bacon.

Charles Steele.

Paul E. De Fere.

I. Gifford Ladd.

J. W. Walker.

Abram S. Hewitt.

August Belmont.

Executive Officers and Managers of Plants:

President, Percival Roberts, Jr.

Vice-presidents: Charles Macdonald, in charge of Railway Contracting Department.

Frank Conger, in charge of Highway Contracting Department.

William M. McCord, in charge of Structural Contracting Department.

Charles M. Jarvis, in charge of Operating Department.

C. C. Schneider, in charge of Engineering Department.

James Christie, in charge of Mechanical Engineering Department.

James P. Kennedy, general manager Operating Department.

Assistant to president, Joshua A. Hatfield.

Treasurer, William H. Connell.

Auditor, Charles C. Price.

Secretary, H. Schoonmaker.

Sales Offices at Home and Abroad:

Albany, N. Y.
Boston, Mass.
Buffalo, N. Y.
Baltimore, Md.
Butte, Mont.
Columbus, Ohio.
Chicago, Ill.
Cleveland, Ohio.
Denver, Col.
Duluth, Minn.
Elmira, N. Y.
Milwaukee, Wis.
Minneapolis, Minn.
New Orleans, La.
Philadelphia, Pa.
Pittsburgh, Pa.
Rochester, N. Y.
Seattle, Wash.
San Francisco, Cal.
Salt Lake City, Utah.
Sidney, N. S. W.
110 Cannon street, London, E. C.

Purchasing Agents:

Francis W. Heisler, Philadelphia.

E. A. Muench, assistant purchasing agent.

The American Car & Foundry Company.

Title:

The American Car & Foundry Company.

Date of Organization:

February 20, 1899, under laws of New Jersey.

Capital Stock Authorized:

Preferred (rate of interest, 7 per cent., non-cumulative)\$30,000,000
Common (par, \$100).....\$30,000,000

Bonded Indebtedness:

None.

Dividends Declared and Dates Thereof:**ON PREFERRED.**

1½ per cent., paid July 1, November 1, 1899, February 1, May 1, July 1, November 1, 1900.

ON COMMON.

½ per cent., paid August 1 and November 1, 1900.

Financial Statement:**STATEMENT OF NET EARNINGS AND DISPOSITION OF SAME.**

Operations for First Fiscal Period, Ending April 30, 1900.

Earnings.

Earnings from all sources (before deducting repairs, renewals, &c., as noted hereunder) for the first fiscal period, 14 months ending April 30, 1900 \$6,831,598.50
Less renewals, replacements, repairs, new patterns, flasks, &c..... 802,085.62
Earnings \$6,029,512.88
Less new construction charged off.... 294,564.14
Net earnings..... \$5,734,948.74

Disposition of Same.**Dividends paid on preferred capital stock:**

1½ per cent. on \$29,090,000 paid July 1, 1899.....\$509,075
1½ per cent. on \$29,090,000 paid November 1, 1899. 509,075
1½ per cent. on \$29,090,000 paid February 1, 1900.. 509,075
1½ per cent. on \$29,090,000 paid May 1, 1900..... 509,075 2,036,300.00

Net surplus for first fiscal period.....\$3,698,648.74

GENERAL BALANCE SHEET, APRIL 30, 1900.**Assets.**

Cost of properties and plants\$52,862,165.60
Add cash expended for properties acquired during the period... 350,000.00 \$53,212,165.60

Materials on hand:

Inventoried at cost or less, about 75 per cent. of which will be used on cars we have contracts to build.
Bar iron, pig iron and miscellaneous supplies \$6,472,996.54
Timber and lumber... 2,098,076.06 8,571,072.60
Accounts receivable 6,448,489.44
Cash in banks and on hand 913,558.44

\$69,145,286.08

Liabilities.

Preferred capital stock..\$30,000,000.00
Less unissued..... 910,000.00 \$29,090,000.00
Common capital stock..\$30,000,000.00
Less unissued..... 910,000.00 29,090,000.00
Audited vouchers for materials not yet due and notes payable... 6,956,480.45
Pay rolls (paid May 10, 1900) 310,156.89
Surplus account..... 3,698,648.74

\$69,145,286.08

Registrar of Stock:

Central Trust Company, New York.

Transfer Agents:

Guaranty Trust Company, New York.

Properties and Plants Owned:

Michigan-Peninsular Car Company, Detroit, Mich.
Missouri Car & Foundry Company, St. Louis, Mo.
Jackson & Woodin Mfg. Company, Berwick, Pa.
Ohio Falls Car Mfg. Company, Jeffersonville, Ind.
Union Car Company, Depew, N. Y.
St. Charles Car Company, St. Charles, Mo.
The Wells & French Company, Chicago, Ill.
Terre Haute Car & Mfg. Company, Terre Haute, Ind.
Buffalo Car Mfg. Company, Buffalo, N. Y.
Niagara Car Wheel Company, Buffalo, N. Y.
Ensign Mfg. Company, Huntington, W. Va.
Pennock Brothers, Minerva, Ohio.
Murray, Dougal & Co., Milton, Pa.
Indiana Car & Foundry Company, Indianapolis, Ind.

Products:

Freight cars.
Passenger cars.
Wheels.
Cast iron pipe.
Axles.
Bar iron.
Castings.

Productive Capacity:

Passenger cars, 500.
Freight cars, 90,000.
Car wheels, 900,000.
Cast iron pipe, 30,000 tons.
Bar iron and axles, 90,000 tons.
Castings, 130,000 tons.

Improvements or Additions Under Way:

None of importance.

Headquarters:

St. Louis, Mo.

Executive Committee:

Wm. McMillan,
W. K. Bixby,
F. H. Eaton.

Board of Directors:

Wm. McMillan, W. K. Bixby, W. J. McBride, S. S. De Lano, St. Louis, Mo.
F. H. Eaton, George Coppel, L. T. Haggin, F. E. Canda, Wm. M. Hager, New York, N. Y.
E. F. Carry, Chicago, Ill.
George Hargreaves, George H. Russel, Detroit, Mich.
L. J. Cox, Terre Haute, Ind.
J. L. Smyser, Louisville, Ky.
C. R. Woodin, Berwick, Pa.
W. N. McMillan, London, England.

Executive Officers:

William McMillan, chairman of board. St. Louis.
W. K. Bixby, president, St. Louis.
Wm. McMillan, treasurer, St. Louis.

Frederick H. Eaton, first vice-president, New York.
 W. J. McBride, general manager, St. Louis.
 W. P. Coleman, second vice-president, New York.
 F. F. Webber, secretary, St. Louis.
 J. M. Buick, auditor.
 S. S. De Lano, comptroller, St. Louis.
 E. R. Hoadley, first assistant treasurer, St. Louis.
 Wm. H. Hager, second assistant treasurer, New York.

Managers of Plants:

F. F. Bixby, St. Louis, Mo.
 J. W. Lawler, St. Charles, Mo.

E. F. Carry, Chicago, Ill.
 Geo. Hargreaves, Detroit, Mich.
 J. D. Ingram, Jeffersonville, Ind.
 Lewis J. Cox, Terre Haute, Ind.
 W. H. Woodin, Berwick, Pa.
 Robert S. Cox, Buffalo, N. Y.
 E. Ensign, Huntington, W. Va.
 C. L. Rogers, Milton, Pa.
 H. E. Frazier, Indianapolis, Ind.

Sales Agents or Offices at Home and Abroad:
 From executive officers.

American Iron & Steel Mfg. Company.

Title:

American Iron & Steel Mfg. Company.

Date of Organization:

August 25, 1899, under laws of Pennsylvania.

Capital Stock Authorized:

Preferred, 60,000 shares at \$50, 5 per cent.,
 cumulative\$3,000,000
 Common (par, \$50, 340,000 shares).....17,000,000

Capital Stock Issued:

Preferred\$3,000,000
 Common (\$5 paid)..... 1,700,000

Bonded Indebtedness:

None.

Dividends Declared and Dates Thereof:**ON PREFERRED.**

Dividends, 1899, 1 2-3 per cent.

In 1900, 1 1/4 per cent., quarterly.

ON COMMON.

50 cents per share, January 25 and April 30, 1900.

25 cents, payable January 23, 1901.

Transfer Agents:

W. W. Gibbs, Drexel Building, Philadelphia, Pa.

Properties and Plants Owned:

J. H. Sternbergh & Son, Reading, Pa.
 Pennsylvania Bolt & Nut Company, Lebanon, Pa.
 National Bolt, Nut & Rivet Works, Reading, Pa.
 Lebanon Iron Company, Lebanon, Pa.
 East Lebanon Iron Company, Lebanon, Pa.

Products:

Bar iron and steel.
 Machine bolts.
 Carriage bolts.
 Nuts, hot pressed and cold punched.
 Washers.
 Turnbuckles.
 Lag screws.
 Railway and dock spikes.
 Track bolts.
 Boiler, ship and structural rivets.
 Car forgings.
 Rods and irons for bridges and buildings, &c.

Productive Capacity:

150,000 gross tons.

Improvements and Additions Under Way:

New rolling mill in Western Pennsylvania.

Headquarters:

Lebanon, Pa.

Executive Committee:

J. N. Sternbergh.
 Horace Brock.
 James Lord.
 H. H. Light.
 Charles W. Wilhelm.

Board of Directors:

J. N. Sternbergh.	Arthur Brock.
Horace Brock.	W. W. Gibbs.
H. M. M. Richards.	James Lord.
John W. Brock.	H. H. Light.
C. W. Wilhelm.	H. M. Sternbergh.
N. J. Hayden.	

Executive Officers and Managers of Plants:**At Lebanon:**

Arthur Brock, president.
 Horace Brock, treasurer.
 James Lord, general manager.
 N. J. Hayden, assistant manager.
 H. M. M. Richards, general auditor.
 H. C. Gable and H. A. Wagner, sales agents.

At Reading:

J. H. Sternbergh, chairman Executive Committee.
 Herbert M. Sternbergh, assistant manager.

At Philadelphia:

W. W. Gibbs, secretary and assistant treasurer,
 Drexel Building.

Branch Offices:

New York, 11 Broadway.
 Baltimore, 806 Equitable Building.
 Atlanta, 1016 Prudential Building.
 San Francisco, 105 Front street.

Purchasing Agent:

H. H. Light, Lebanon.

American Radiator Company.

Title:

American Radiator Company.

Date of Organization:

February 11, 1899.

Capital Stock Authorized:

Preferred (rate of interest, 7 per cent., cu-
 mulative\$5,000,000
 Common (par, \$100).....\$5,000,000

Capital Stock Issued:

Preferred\$3,000,000

Common\$4,893,000

Bonded Indebtedness:

None.

Dividends Declared and Dates Thereof:**ON PREFERRED.**

Quarterly dividends of 1 1/4 per cent. have been paid
 on preferred stock, beginning May 15, 1899.

ON COMMON.

None.

Financial Statement:

BALANCE SHEET, JANUARY 31, 1900.

<i>Assets.</i>		
Plants, real estate, machinery, patents, &c.....	\$6,692,395.06	
Depreciation for last year.	100,000.00	\$6,592,395.06
Cash	\$209,373.90	
Notes receivable.....	53,671.90	
Stocks and securities.....	7,550.00	
Accounts receivable.....	878,652.82	
Raw material, supplies and finished product, inventoried at cost.....	842,502.39	1,991,751.01
		\$8,584,146.07
<i>Liabilities.</i>		
Capital stock, preferred..	\$3,000,000.00	
Capital stock, common....	4,893,000.00	
	\$7,893,000.00	
Accounts payable.....	191,484.25	\$8,084,484.25
Balance		\$499,661.82
Total net profits for 12 months, ending January 31, 1900.....	\$657,161.82	
Less three quarterly dividends paid during year on preferred stock....	157,500.00	
Balance		\$499,661.82
Registrar of Stock:		
Illinois Trust & Savings Bank, Chicago.		
Transfer Agents:		
The Equitable Trust Company, Chicago.		
Properties and Plants Owned:		
American Radiator Company (Old), Chicago.		
Standard Radiator Company, Buffalo, N. Y.		

Titusville Iron Company, Titusville, Pa.
St. Louis Radiator Company, St. Louis, Mo.

Products:

Steam and hot water heating boilers.
Radiators.

Headquarters:

Lake and Dearborn streets, Chicago, Ill.

Board of Directors:

John B. Pierce, Buffalo.
Edward A. Sumner, Detroit.
Clarence Carpenter, Detroit.
John Fertig, Titusville, Pa.
Ralph M. Dyar, Detroit.
Geo. W. Parker, St. Louis.
Joseph Bond, Chicago.
Clarence M. Woolley, Chicago.
Charles H. Hodges, Chicago.
John L. McKinney, Titusville, Pa.
Frank O. Lowden, Chicago.
Walter S. Russel, Detroit.
Henry Bond, Buffalo.
Wm. T. Baker, Chicago.
William H. Hill, East Orange, N. J.

Executive Officers:

Joseph Bond, president.
John B. Pierce, first vice-president.
Edward A. Sumner, second vice-president.
Charles H. Hodges, treasurer.
Clarence M. Woolley, secretary.

Sales Agents or Offices at Home and Abroad:

New York, N. Y., 42-44 East Twentieth street.
Boston, Mass., 44 Oliver street.
Philadelphia, Pa., 622 Arch street.
Buffalo, N. Y., 922 Prudential Building.
St. Louis, Mo., 207-209 North Tenth street.
Minneapolis, Minn., 513 Guaranty Loan Building.
Denver, Col., 831 Fifteenth street.

American Sheet Steel Company.

Title:

American Sheet Steel Company.

Date of Organization:

March 28, 1900.

Capital Stock Authorized:

Preferred	\$26,000,000
Common	\$26,000,000
	\$52,000,000

Capital Stock Issued:

Preferred	\$24,500,000
Common	\$24,500,000

Bonded Indebtedness:

None.
Purchase money mortgages assumed..... \$2,000,000

Financial Statement:

First fiscal year not yet elapsed.

Dividends Declared and Dates Thereof:

On preferred, 1¼ per cent., payable January 15, 1901.

Registrar of Stock:

First National Bank, New York.

Transfer Agents:

Guarantee Trust Company, New York.

Properties and Plants Owned:

Ætna-Standard Iron & Steel Company, Bridgeport, Ohio.
Apollo Iron & Steel Company, Vandergrift, Pa.
Cambridge Iron & Steel Company, Cambridge, Ohio.
Canton Rolling Mill Company, Canton, Ohio.
Chartiers Iron & Steel Company, Carnegie, Pa.

Chester Rolling Mill Company, East Liverpool, Ohio.
Corning Steel Company, Hammond, Ind.
Coshocton Rolling Mill Company, Coshocton, Ohio.
Dennison Rolling Mill Company, Dennison, Ohio.
Dresden Iron & Steel Sheet Company, Dresden, Ohio.
Falcon Iron & Nail Company, Niles, Ohio.
Hyde Park Iron & Steel Company, Hyde Park, Pa.
Kirkpatrick & Co., Leechburg, Pa.
P. H. Laufman & Co., Paulton, Pa.
Midland Steel Company, Muncie, Ind.
New Philadelphia Iron & Steel Company, New Philadelphia, Ohio.
Old Meadow Rolling Mill Company, Scottdale, Pa.
Pittsburgh Sheet Mfg. Company, Shousetown, Pa.
Piqua Rolling Mill Company (Cincinnati Corrugating Company), Piqua, Ohio.
Reeves Iron Company, Canal Dover, Ohio.
Republic Iron & Steel Company's Sheet Mills, outside of Alabama.
Saltsburg Rolling Mill Company, Saltsburg, Pa.
Scottdale Iron & Steel Company, Scottdale, Pa.
Struthers Iron & Steel Company, Struthers, Ohio.
W. Dewees Wood Company, McKeesport, Pa.
Wellsville Plate & Sheet Iron Company, Wellsville, Ohio.
West Penn Sheet Steel Company, Leechburg, Pa.
Sharon Iron Company, Sharon, Pa.

Products:

Sheet Iron and Steel, black, galvanized, &c.
Planished Iron.
Polished Steel Sheets.

Headquarters :

Battery Park Building, New York.

Executive Committee :

Geo. G. McMurtry.
W. T. Graham.
W. H. Moore.
D. G. Reid.
W. B. Leeds.
Wallace P. Bache.

Board of Directors :

Geo. G. McMurtry.	A. W. Brown.
W. T. Graham.	F. S. Wheeler.
W. H. Moore.	M. I. Arms.
W. B. Leeds.	J. H. Moore.
D. G. Reid.	R. J. Beatty.
Henry Wick.	J. G. Battelle.
R. M. Gilbert.	W. E. Reis.
Wallace P. Bache.	J. A. Topping.
T. M. Day, Jr.	

Executive Officers and Managers of Plants :

Geo. G. McMurtry, president.
John A. Topping, vice-president.
Richard G. Wood, vice-president.
Wallace P. Bache, assistant to president.

F. S. Wheeler, treasurer.

H. B. Wheeler, secretary and assistant secretary.

A. W. Brown, general superintendent.

Sales Agents or Officers at Home and Abroad :

Stockton & Brainard, Marquette Building, Chicago.
T. W. Simpers, Land Title Building, Philadelphia.
W. J. Wetstein & John W. Good, Security Building, St. Louis.
F. C. Milliken, Times Building, Pittsburgh.
S. J. Waterman, Neave Building, Cincinnati.
S. L. Mitchel, Hennen Building, New Orleans.
Hoge & Swift, Portland, Oregon.
W. T. Shannon, 34 West Ninth street, Chattanooga.
T. H. Speddy, San Francisco.
Lee Chamberlain, Los Angeles.
F. A. Goodrich & Co., Chamber of Commerce, Detroit.
L. A. Hastings, 1622 Arapahoe street, Denver.
B. & S. H. Thompson & Co., Montreal, Canada.

Purchasing Agents :

J. A. Smith, Jr., Battery Park Building, New York, N. Y.
R. A. McKinney, district purchasing agent, Vandergift Building, Pittsburgh, Pa.

American Shipbuilding Company.

Title :

The American Shipbuilding Company.

Date of Organization :

April 20, 1899.

Capital Stock Authorized :

Preferred (rate of interest, 7 per cent., non-cumulative)\$15,000,000
Common (par, \$100).....\$15,000,000

Capital Stock Issued :

Preferred\$7,900,000
Common\$7,600,000

Bonded Indebtedness :

None.

Dividends Declared and Dates Thereof :

ON PREFERRED.

Quarterly on preferred, commencing July 1, 1899.

ON COMMON.

None.

Financial Statement :

For 15 Months, Ended June 30, 1900.

BALANCE SHEET, JUNE 30.

Assets.

Plants and property.....	\$14,076,726
Improvements to plants.....	638,176
Material on hand (market value).....	633,519
Accounts and bills receivable and cash....	858,484
Work and construction, balance earned and due us.....	1,352,708
Total	\$17,559,615

Liabilities.

Capital stock, preferred.....	\$7,900,000
Capital stock, common.....	7,600,000
Accounts and bills payable.....	1,490,949
Undivided profits or surplus.....	568,665
Total	\$17,559,615

The net earnings from April, 1899, to June 30, 1900, were \$1,100,665.85, out of which dividends of 7 per cent. on the preferred stock, aggregating \$532,000, were paid, leaving a surplus of \$568,666.

Transfer Agents :

Corporation Trust Company of New Jersey.

Properties and Plants Owned :*Owned :*

Cleveland Ship Building Company, Cleveland and Lorain, Ohio.
Globe Iron Works, Cleveland, Ohio.
Ship Owners' Dry Dock Company, Cleveland, Ohio.

Controlled :

Superior Ship Building Company, West Superior, Wis.
Chicago Ship Building Company, Chicago, Ill.
Milwaukee Dry Dock Company, Milwaukee, Wis.
Detroit Ship Building Company, Detroit and Wyandotte, Mich.
West Bay City Ship Building Company, Bay City, Mich.
Buffalo Dry Dock Company, Buffalo, N. Y.

Products :

Ship builders.
Engine builders.
Boiler builders.
Dry Dock proprietors.

Productive Capacity :

7 building yards.
15 dry docks.

Improvements and Additions Under Way :

None.

Headquarters :

120 Viaduct, Cleveland, Ohio.

Executive Committee :

W. L. Brown, Chicago.
A. McVittie, Detroit.
James C. Wallace, Cleveland.
R. L. Ireland, Cleveland.
Luther Allen, Cleveland.
L. M. Bowers, Cleveland.
W. E. Fitzgerald, Milwaukee.

Board of Directors :

W. L. Brown, Chicago.
A. VeVittie, Detroit.
James C. Wallace, Cleveland.
H. H. Porter, Jr., Chicago.
Robert Wallace, Cleveland.
H. M. Hanna, Cleveland.
L. C. Hanna, Cleveland.

Robert L. Ireland, Cleveland.
 Luther Allen, Cleveland.
 W. E. Fitzgerald, Milwaukee.
 Andrew M. Joys, Milwaukee.
 W. C. McMillan, Detroit.
 W. T. C. Carpenter, New Jersey.
 L. M. Bowers, Cleveland.
 J. A. McGean, Cleveland.

Executive Officers and Managers of Plants:

W. L. Brown, president, Chicago.
 R. L. Ireland, vice-president, Cleveland.
 R. C. Wetmore, secretary and treasurer, Cleveland.
 J. C. Wallace, general manager, Cleveland.

Purchasing Agent:

N. S. Thrasher, Cleveland, Ohio.

American Smelting & Refining Company.

Title:

American Smelting & Refining Company.

Date of Organization:

April 4, 1899, under New Jersey laws.

Capital Stock Authorized:

Preferred (rate of interest, 7 per cent., cumulative)\$32,500,000
 Common (par, \$100, entitled to all earnings over 7 per cent. on preferred stock)....\$32,500,000

Capital Stock Issued:

Preferred\$27,400,000
 Common\$27,400,000

Bonded Indebtedness:

\$1,066,000, 6 per cent., Omaha & Grant bonds, due March 1, 1911, payable in yearly installments.

Dividends Declared and Dates Thereof:**ON PREFERRED.**

Dividend No. 1 paid October 10, 1899, 1¾ per cent.
 Dividend No. 2 paid January 9, 1900, 1¾ per cent.
 Dividend No. 3 paid April 10, 1900, 1¾ per cent.
 Dividend No. 4 paid July 10, 1900, 1¾ per cent.
 Dividend No. 5 paid October 9, 1900, 1¾ per cent.
 Dividend No. 6 payable January 8, 1901, 1¾ per cent.

ASSETS AND LIABILITIES.

At Close of Business, April 30, 1900.

Assets.

Real estate, plants and machinery.....	\$48,994,499.38
Inventories of stock on hand.....	11,773,923.10
Cash, accounts receivable, bills receivable, stock and bonds.....	3,028,974.02
Treasury stock.....	10,200,000.00
	<hr/> \$73,997,396.50

Liabilities.

Accounts and bills payable.....	\$4,764,488.65
Bonds outstanding (\$1,005,000 since paid) .	2,253,000.00
Capital stock.....	65,000,000.00
Earnings	\$4,634,027.90
Repairs and betterments \$615,089.50	
General expense, interest and taxes	493,977.55
	\$1,109,067.05
Net profits:	
First six months of fiscal year..	1,228,943.14
Second six months of fiscal year..	2,296,017.71
	3,524,960.85
Less three dividends paid on preferred stock.....	1,545,053.00
Surplus on April 30....	\$1,979,907.85
	<hr/> \$1,979,907.85
	<hr/> \$73,997,396.50

Registrar of Stock:

Chase National Bank.

Transfer Agents:

Manhattan Trust Company.

Properties and Plants Purchased:

Omaha & Grant Smelting & Refining Company, refinery at Omaha and smelting plants at Omaha, Denver, Col.
 Consolidated Kansas City Smelting & Refining Company, refinery at Kansas City and smelting works at Kansas City, Leadville, El Paso and El Carmen, Mexico, and Silver City, New Mexico.
 National Smelting & Refining Company, with refinery and smelter at Chicago.
 United Smelting & Refining Company, smelting plants at Helena and Great Falls, Mont.
 Pueblo Smelting & Refining Company, refinery and smelting plant at Pueblo, Col.
 Germania Smelting Company, smelting plant at Salt Lake City, Utah.
 Chicago & Aurora Smelting & Refining Company, refinery and smelting plant at Aurora, Ill.
 Colorado Smelting Company, smelting plant at Pueblo, Col.
 Globe Smelting & Refining Company, refinery and smelting plant at Denver, Col.
 San Juan Smelting & Mining Company, smelter at Durango, Col.
 Hanauer Smelting Works, smelter at Salt Lake City, Utah.
 Pennsylvania Lead Company and Pennsylvania Smelting Company, smelter at Salt Lake City, Utah.
 Bi-Metallic Smelting Company, smelter at Leadville, Col.

Products:

Gold, silver, lead, copper, blue vitriol and zinc sulphate.

Improvements or Additions Under Way:

The roasting plants are being largely increased at a number of the works, and new blast furnaces of larger size than heretofore used have been added at some of them. At other works a number of old furnaces are being rebuilt on much larger lines. Very extensive dust catching devices are being added to three of the works. The construction of an entirely new plant of 1200 tons capacity and equipped with all practicable devices for saving labor and fuel is under way in Utah.

Headquarters:

Empire Building, New York.

Executive Committee:

E. W. Nash.
 Barton Sewell.
 H. H. Rogers.
 Leonard Lewisohn.
 Grant B. Schley.

Board of Directors:

E. W. Nash.	Dennis Sheedy.
J. B. Grant.	A. R. Meyer.
Guy C. Barton.	N. Witherill.
W. S. Gurnee.	R. S. Towne.
Barton Sewell.	G. B. Schley.
Anton Eilers.	H. H. Rogers.
M. D. Thatcher.	Leonard Lewisohn.
H. H. Moffat.	H. L. Terrell.

Executive Officers :

E. W. Nash, president.
Barton Sewell, vice-president.
Edward Brush, secretary.
Thomas B. Adams, assistant treasurer.

Operating Committee :

J. B. Grant.
Anton Eilers.

Ore Purchasing Committee :

A. R. Meyer, chairman.

Managers of Plants :

Colorado.—Grant plant, J. B. Grant.
Globe plant, Dennis Sheedy.
Pueblo plant, F. Ginterman.
Eilers plant, Karl Eilers.

Durango plant, D. MacLean.
Arkansas Valley plant, J. H. Weddle.
Union plant, J. H. Weddle.
Bi-Metallic plant, Franklin Ballou.

Montana.—East Helena plant, C. W. Whitley.
Great Falls plant, F. M. Smith.

Nebraska.—Omaha plant, W. T. Page.

Illinois.—National plant, M. F. Holmes.

Utah.—Germania and Mingo plant, T. R. Jones.

Texas.—El Paso and Silver City plants, H. R. Simpson.

Kansas.—Argentine plant, H. R. Simpson.

Sales Agents :

N. Corwith, Chicago.

Purchasing Agent :

J. B. Arnold, Chicago.

American Steel Hoop Company.

Title :

American Steel Hoop Company.

Date of Organization :

April 17, 1899, under laws of New Jersey.

Capital Stock Authorized :

Preferred (7 per cent., cumulative).....\$14,000,000
Common (par, \$100).....\$19,000,000

Capital Stock Issued :

Preferred\$14,000,000
Common\$19,000,000

Bonded Indebtedness :

None.

Dividends Declared and Dates Thereof :**ON PREFERRED.**

Regular quarterly dividends on preferred stock, 1½ per cent., declared in July, October, 1899, and January, April, July and October, 1900.

ON COMMON.

None.

Financial Statement :**Assets.**

Plants, real estate and machinery....	\$30,000,000.00
Improvements during year.....	426,350.02
Ore and coal properties purchased during year.....	611,428.00
Merchandise inventory at cost.....	3,387,433.42
Accounts receivable.....	2,291,060.76
Bills receivable.....	180,156.51
Cash	1,276,176.85
	<hr/>
	\$38,172,605.56

Liabilities.

Capital stock:		
Preferred	\$14,000,000.00	
Common	19,000,000.00	\$33,000,000.00
Accounts payable.....		1,125,709.11
Surplus for year.....	\$5,026,896.45	
Less 7 per cent. dividend on preferred stock for year	980,000.00	*4,046,896.45
		<hr/>
		\$38,172,605.56

* The directors at their meeting after the stockholders' meeting charged off \$1,000,000.00 for depreciation, leaving the net surplus \$3,046,896.45.

Transfer Agents :

Manhattan Trust Company.

Properties and Plants Owned :

J. Painter & Sons Company, Pittsburgh, Pa.
Isabella Furnace Company, Pittsburgh, Pa.
Wm. Clark's Sons Company, Pittsburgh, Pa.
Lindsay & McCutcheon, Pittsburgh, Pa.
Union Iron & Steel Company, Youngstown, Ohio, which embraces the upper and lower mills at Youngstown and mills at Warren and Girard, Ohio.

✓ Monessen Steel Company, Monessen, Pa.

✓ P. L. Kimberly Company, works at Sharon, Pa., and at Greenville, Pa.

✓ Portage Iron Company, Duncansville, Pa.

✓ Pomeroy Iron & Steel Company, Pomeroy, Ohio.

Also operating bar mills of the former Aetna-Standard Works, at Bridgeport and Mingo Junction, Ohio.

Ore and Coke Properties Owned or Interest :

One-fifth interest in Mahoning Steel & Ore Company, Hibbing, Minn., producing 1,000,000 tons of ore annually.

One-third interest in coal property of National Mining Company, comprising about 7000 acres, at Bridgeville, near Pittsburgh, Pa.

Isabella Furnace plant, embraces coal property at Cokeville, Pa., ovens at Cokeville, manufacturing about 350 tons of coke per day.

One-half interest Union Ore Company.

Products :

Steel hoops.
Steel bands.
Cotton ties.
Steel bars.
Special shapes.
Angles.
Channels.
Small tee rails.
Bar iron.
Pig iron.
Open hearth steel.
Muck bars.
Skelp.

Productive Capacity :

700,000 tons finished material.
250,000 tons pig iron.

Improvements or Additions Under Way :

The improvements begun at the Isabella furnaces immediately after organization are now nearing completion. These comprise installation of new compound blowing engines, new water tube boilers and new stoves throughout.

Work is now under way on enlarging the stacks and on the introduction of new trestles, ore bins and skip hoists. In conjunction therewith work is also under way on a new electric power plant and a new pumping plant and on pig casting machines. With the completion of the foregoing this plant will be up to date in every respect.

Headquarters :

New York.

Executive Committee :

C. S. Guthrie, chairman.
D. G. Reid.

W. E. Reis.
Geo. E. Painter.
Veryl Preston.
W. B. Leeds.
W. H. Moore.

Board of Directors:

C. S. Guthrie.	C. A. Painter.
Veryl Preston.	Geo. E. Painter.
R. M. Gilbert.	Henry Wick.
W. T. Graham.	J. H. Moore.
F. S. Wheeler.	W. B. Leeds.
D. G. Reid.	J. J. Treacy.
W. E. Reis.	W. H. Moore.

Executive Officers:

C. S. Guthrie, president and chairman.
Veryl Preston, vice-president.

F. S. Wheeler, treasurer.
F. L. Clark, manager.

Sales Offices:

General sales agent,
Severn P. Ker, Battery Park Building, New York.
New York, Battery Park Building.
Pittsburgh, Empire Building.
Chicago, Marquette Building.
St. Paul, Endicott Building.
Boston, 8 Oliver street.
St. Louis, Fullerton Building.
San Francisco, 23 Davis street.
Cleveland, Williamson Building.
Cincinnati, Chamber of Commerce Building.
Atlanta, Prudential Building.
Montreal, Temple Building.
London, 77-78 Gracechurch street.

The American Steel & Wire Company of New Jersey

(Report as of October 31, 1900)

Title:

The American Steel & Wire Company of New Jersey.

Date of Organization:

January 13, 1899, under laws of New Jersey.

Capital Stock Authorized:

Preferred (rate of interest, 7 per cent. cumulative)	\$40,000,000
Common (par, \$100)	\$50,000,00

Capital Stock Issued:

Preferred	400,000 shares.
Common	500,000 shares.

Bonded Indebtedness:

\$101,271.72.

Dividends Declared and Dates Thereof:**ON PREFERRED STOCK.**

Dividend No. 1 paid April 15, 1899.
Dividend No. 2 paid July 15, 1899.
Dividend No. 3 paid October 14, 1899.
Dividend No. 4 paid January 2, 1900.
Dividend No. 5 paid April 2, 1900.
Dividend No. 6 paid July 2, 1900.
Dividend No. 7 paid October 2, 1900.

ON COMMON STOCK.

7 per cent., of which three payments have been made,
on April 2, July 2 and October 2, 1900. The fourth
is to be made January 2, 1901.

Financial Statement:

CONDITION DECEMBER 31, 1899.

Assets.

Real estate, buildings, plant and ma- chinery	\$79,629,513.00
Investments and advances to subsidi- ary companies	4,064,475.00
Bills and accounts receivable	8,247,220.00
Inventories	10,995,446.00
Cash	3,325,294.00
Total	\$106,161,948.00

Liabilities.**Capital stock:**

Preferred	\$40,000,000.00
Common	50,000,000.00
	<hr/> \$90,000,000.00
Accounts payable, &c., (since paid)...	4,899,418.00
Reserves:	
Depreciation	\$1,000,000.00
Bad debts, discounts, &c..	200,000.00
	<hr/> 1,200,000.00

Profit and loss account:

Profit for calendar year 1899	\$13,362,530.00
Less—	
Depreciation	\$1,000,000
Reserve for possible bad debts, dis- counts, &c..	200,000
	<hr/> 1,200,000.00
Net profit	\$12,162,523.00
Deduct dividend, 7 per cent. on preferred ..	2,100,000.00
	<hr/> 10,062,530.00
Total	\$106,161,948.00

The company was not incorporated until January 14,
1899, but as the properties were taken over as
going concerns as of January 1, 1899, the profits
for the entire calendar year are included above.

Registrar:

Farmers' Loan & Trust Company, New York.

Transfer Agents:

Corporation Trust Company, Jersey City, N. J.

Plants Acquired, Owned and Controlled:

American Steel & Wire Company, Illinois, plants at
Anderson, Ind.; DeKalb, Ill., 2; Evanston, Ill.;
Joliet, Ill., 2; St. Louis, Mo.; Cleveland, Ohio, 3;
Salem, Ohio; Findlay, Ohio; Allentown, Pa.; Bea-
ver Falls, Pa.; Rankin, Pa.
Washburn & Moen Mfg. Company, plants at Worces-
ter, Mass., 2; Waukegan, Ill.; San Francisco, Cal.
Worcester Wire Company, plants at Worcester, Mass.
Cleveland Rolling Mill Company, plants at Cleveland,
Ohio; Newburgh, Ohio, and iron mine property at
Negaunee, Mich.
Indiana Wire Fence Company, plant at Crawfords-
ville, Ind.
Garden City Wire & Spring Company, plant at Chi-
cago, Ill.
Consolidated Barb Wire Company, plants at Joliet,
Ill.; Lawrence, Kan.
Laidlaw Bale Tie Company, plant at Joliet, Ill.
Cincinnati Barb Wire Fence Company, plant at Cin-
cinnati, Ohio.
Union Rolling Mill Company (only), plant at Cleve-
land, Ohio, known as Emma Furnace.

Portage Iron Company (part), plant at Duncansville, Pa.
 Newburgh Wire & Nail Company, plant at Newburgh, N. Y.
 Allegheny Furnace Company, plant at Allegheny, Pa.
 Pittsburgh Wire Company, plant at Braddock, Pa.
 Shenango Valley Steel Company (part), plant at New Castle, Pa.
 Oliver Wire Company, plant at Pittsburgh, Pa.
 Oliver & Snyder Steel Company, plant at Pittsburgh, Pa.
 Shoenberger Steel Company, plant at Pittsburgh, Pa., also coal land and coke ovens in Fayette and Westmoreland counties.
 Puget Sound Wire Nail & Steel Company, plant at Everett, Wash.
 Edgar Zinc Company, plants at St. Louis, Mo.; Cherryvale, Kan.
 American Coke Company, comprising coal lands in Westmoreland, Green and Fayette counties, Pa., and coke ovens in Westmoreland and Fayette counties.
 American Supply Company, at Baggageley, Pa.
 American Mining Company, comprising Clark-Sauntry Mines at Virginia, Minn.; Cuff Mines, at Iron Mountain, Mich.; Negaunee Mines, at Negaunee, Mich.
 Williamsburg, Pa., limestone quarries.
 Furnaces, railroad and ore property of Crown Point Iron Company, Crown Point, N. Y.
 The plants are all owned in fee except the following:
 Shoenberger Steel Company.
 Edgar Zinc Company.
 American Coke Company.
 American Supply Company.
 American Mining Company.
 These concerns are controlled by stock ownership.

Products :

Coke.
 Pig iron.
 Bessemer steel billets.
 Open hearth steel billets.
 Wire rods.
 Plain wire.
 Barb wire.
 Fencing and netting staples.
 Wire nails and brads.
 Poultry netting.
 Baling wire.
 Bale ties.
 Woven wire fences.
 Electrical wires:
 Galvanized iron and steel telegraph wires.
 Copper wires and cables.
 Insulated wires and cables.
 Lead incased wires and cables.
 Copper rail bonds.
 Copper trolley wires.
 Springs:
 Flat and coiled wire springs.
 Car truck springs, trolley springs.
 Car seat springs, bunk springs, brake springs.
 Shafting:
 Cold-drawn steel shafting; rounds, squares, hexagons, flats or odd shapes.
 Wire Nails.
 Spikes.
 Pole steps.
 Tacks.
 Rivets.
 Horse shoes and iron calks.
 Tank, boiler and fire box steel plates.
 Ship plates.
 Bar steel and shapes.
 Copperas.
 Venetian red.

Productive Capacity :

	Gross tons per month.
Pig Iron:	
Central, Cleveland.....	18,000
Emma, Cleveland.....	6,500
Newburgh, Cleveland.....	4,000
Allegheny, Pittsburgh.....	12,000
Shoenberger, Pittsburgh.....	13,500
Total	49,000
Steel:	
Newburgh, Cleveland: Bessemer.....	32,000
Open hearth.....	1,600
Shoenberger, Pittsburgh: Bessemer.....	11,000
Open hearth.....	4,000
Oliver & Snyder, Pittsburgh: Bessemer.....	17,000
North and South, Worcester: Open hearth....	4,000
Total	69,600
Wire Rods:	
Anderson	6,300
Waukegan	12,500
Consolidated, Cleveland.....	7,500
American, Cleveland.....	9,100
H. P., Cleveland.....	5,200
Newburgh, Cleveland.....	10,500
Beaver Falls.....	8,500
Braddock	6,500
New Castle.....	7,000
Rankin	8,500
South Side, Pittsburgh.....	8,000
Allentown	6,000
Duncansville	1,800
Newburgh, N. Y.....	2,500
North and South, Worcester.....	9,000
Total	108,900
Wire Mills:	
	Net tons per month.
Anderson	5,200
De Kalb	4,200
Scott street, Joliet.....	10,000
Rockdale street, Joliet.....	6,000
Bluff street, Joliet.....	3,000
Meeker avenue, Joliet.....	700
Garden City.....	2,500
St. Louis	3,600
Waukegan	5,000
Cincinnati	4,500
Consolidated, Cleveland.....	6,500
American, Cleveland.....	4,500
H. P., Cleveland.....	5,000
Findlay	3,000
Newburgh, Cleveland.....	7,000
Beaver Falls.....	5,500
Braddock	5,000
New Castle.....	6,500
Rankin	8,500
South Side.....	10,000
Allentown	6,000
Duncansville	1,500
Newburgh, N. Y.....	1,600
San Francisco.....	1,200
Central, Worcester.....	600
North and South, Worcester.....	6,500
Total	113,600
Galvanizing Departments:	
Anderson	1,500
De Kalb	4,000
Scott street, Joliet.....	4,000
Rockdale street, Joliet.....	4,000
Bluff street, Joliet.....	1,200
St. Louis.....	2,500
Waukegan	5,000
Cincinnati	4,500
Consolidated, Cleveland.....	2,000
American, Cleveland.....	4,000

H. P.	1,200
Newburgh, Cleveland	2,400
Beaver Falls	1,700
Braddock	2,000
Rankin	4,200
South Side	4,200
Allentown	4,000
Newburgh, N. Y.	700
North and South, Worcester	2,550

Total 55,650

Barb Wire:

Anderson	750
De Kalb	4,500
Scott street, Joliet	3,000
Rockdale street, Joliet	2,800
Bluff street, Joliet	1,250
St. Louis	1,750
Waukegan	1,400
Cincinnati	2,000
Consolidated, Cleveland	2,000
Newburgh, Cleveland	1,000
Beaver Falls	1,000
Rankin	2,500
South Side	4,500
Allentown	3,300
Newburgh, N. Y.	700
North and South, Worcester	1,250

Total 33,700

Wire Nails:

	Kegs per month.
Anderson	66,000
De Kalb	50,000
Scott street, Joliet	100,000
Bluff street, Joliet	16,000
Garden City	3,500
St. Louis	20,000
Cincinnati	10,000
Consolidated, Cleveland	50,000
H. P.	130,000
Findlay	60,000
Salem	45,000
Newburgh, Cleveland	20,000
Beaver Falls	75,000
Braddock	45,000
New Castle	150,000
Rankin	75,000
South Side	120,000
Allentown	45,000
Duncansville	30,000
Newburgh, N. Y.	12,000
San Francisco	16,500
North and South, Worcester	13,000

Total 1,151,500

Net tons

Field Fencing:

	per month.
De Kalb	1,400
Evanston	40
Rockdale street, Joliet	1,200
Bluff Street, Joliet	260
Cincinnati	20
Consolidated, Cleveland	250
Rankin	1,250
South Side	100

Total 4,520

Poultry Netting:

Evanston	350
Rockdale street, Joliet	160

Total 510

Bundles

Bale Ties:

	per month.
Rockdale street, Joliet	14,000
Bluff street, Joliet	5,000
Meeker avenue, Joliet	50,000

Waukegan	19,000
Cincinnati	3,500
North and South, Worcester	13,250

Totals 104,750

Kegs

per month.

Staples:

Waukegan	1,200
Cincinnati	2,300
Consolidated, Cleveland	1,200
Newburgh, Cleveland	2,000
Bluff street, Joliet	200
Beaver Falls	1,000
Rankin	3,500
South Side	4,000
San Francisco	325

Total 15,725

Improvements or Additions Under Way:

- 4 open hearth furnaces at Cleveland.
- 4 open hearth furnaces at Worcester.
- 1 blooming mill at Worcester.
- 1 blast furnace at Edith, Allegheny.
- 1 blast furnace at Central, Cleveland.
- 1 blast furnace at Neville Island.
- Improvement of Bessemer plant and billet mill at Shoenberger plant.
- 230 coke ovens, Westmoreland County, Pa.
- 1000 coke ovens and 1 5000-ton per day coal plant, Fayette County, Pa.

Headquarters:

- Rookery Building, Chicago.
- Empire Building, New York.

Executive Committee:

- Wm. Edenborn, chairman.
- I. L. Ellwood.
- J. W. Gates.
- W. P. Palmer.
- Alfred Clifford.
- J. Lambert.
- Thos. Dolan.

Executive Officers:

- Chairman, Alfred Clifford.
- President, W. P. Palmer.
- First vice-president, Wm. Edenborn.
- Second vice-president, I. L. Ellwood.
- Third vice-president, P. W. Moen.
- Fourth vice-president, S. H. Chisholm.
- Treasurer, F. L. Watson.
- Assistant treasurer in Chicago, A. F. Allen.
- Assistant treasurer in New York, T. P. Alder.
- Secretary, C. S. Roberts.
- Assistant secretary in Chicago, O. Owen.
- Assistant secretary in New York, F. E. Patterson.
- General manager, Wm. P. Palmer.
- General sales agent, Frank Baackes.
- Auditor, C. A. Honecker.
- Assistant auditor, C. A. Vogt.
- Chief engineer, Fred H. Daniels.
- General superintendent, C. L. Miller.
- Assistant to general manager, A. S. Chisholm.

Directors:

- J. W. Gates.
- Isaac L. Ellwood.
- W. Edenborn.
- Philip W. Moen.
- J. Lambert.
- W. P. Palmer.
- Alfred Clifford.
- Thos. Dolan.
- Stewart H. Chisholm.
- John A. Drake.
- James Hopkins.
- Leslie D. Ward.
- P. A. W. Widener.
- Randal Morgan.

Managers of Plants :*Worcester, Mass.:*

Charles Ranlet, manager.
H. G. Stoddard, assistant manager.
E. Trotz, superintendent.

New York, N. Y.:

F. E. Patterson, manager.
W. M. Douglas, superintendent, Allentown, Pa.

Pittsburgh, Pa.:

W. H. Rowe, manager..
J. H. Price, assistant manager.
S. W. Tener, assistant manager.
C. L. Miller, general superintendent.

Cleveland, Ohio:

A. T. De Forest, manager.
Robt. Ney, assistant manager.
J. H. Early, assistant manager.

Chicago, Ill.:

E. C. Lott, manager.

John Y. Brooks, superintendent, Joliet.
H. E. Rice, superintendent, Waukegan.
H. O. Cary, superintendent, De Kalb.
F. C. Gedge, superintendent, Anderson.

Sales Agents :*General Sales Agent:*

Frank Baackes, Chicago.

Assistant General Sales Agents:

Geo. A. Cragin, Chicago.
D. A. Merriman, Chicago.
T. H. Taylor, New York.

Purchasing Agents :

E. E. Stone, general purchasing agent.
E. W. Donahoe, purchasing agent, Chicago district.
J. N. Fleming, purchasing agent, Cleveland district.
R. K. Hance, purchasing agent, New York district.
Robt. McMillan, purchasing agent, Pittsburgh district.
G. A. Cheever, purchasing agent, Worcester district.

American Tin Plate Company.

Title :

American Tin Plate Company.

Date of Organization :

December 15, 1898, under laws of New Jersey.

Capital Stock Authorized :

Preferred (7 per cent., cumulative).....\$20,000,000
Common (par, \$100).....\$30,000,000

Capital Stock Issued :

Preferred\$18,325,000
Common\$28,000,000

Bonded Indebtedness:

None.

Dividends Declared and Dates Thereof:*ON PREFERRED.*

Dividends paid on preferred stock, 1¼ per cent.
quarterly on the last days of April, July, October,
1899, and January, April, July, October, 1900.

ON COMMON.

None.

Financial Statement :

The annual statement, which is dated December 31,
1899, shows the following:

Assets.

Plants, real estate, patents,
machinery, &c.....\$43,404,508.04
Merchandise, inventory... 4,951,925.40
Accounts receivable..... 1,518,247.35
Cash 988,984.34
Total assets.....\$50,864,665.13

Liabilities.

Capital stock, preferred..\$18,325,000.00
Capital stock, common... 28,000,000.00
Total capital stock.....\$46,325,000.00
Purchase money mortgages, assumed.. 270,000.00
Accounts payable..... 1,656,238.98
Surplus 2,613,426.15
Total liabilities.....\$50,864,665.13

The annual report filed in the State of New York
shows the following:

The amount of their capital stock, and
the amount authorized to be issued,
is\$50,000,000.00
The proportion actually issued is..... 46,325,000.00
The amount of their debts does not ex-
ceed the sum of..... 1,226,238.00
The amount of their assets is at least
the sum of..... 7,460,167.00

Registrar of Stock:

First National Bank, New York.

Transfer Agents:

Guaranty Trust Company, New York.

Properties and Plants Owned:

American Tin Plate Company, Elwood, Ind.
American Tin Plate Company, Montpelier, Ind.
Beaver Tin Plate Company, Lisbon, Ohio.
Crescent Sheet & Tin Plate Company, Cleveland,
Ohio.
Falcon Tin Plate & Sheet Company, Niles, Ohio.
Humbert Tin Plate Company, Connellsville, Pa.
Irondale Sheet & Iron Company, Richmond, Ind.
La Belle Iron Works, Wheeling, W. Va.
Monongahela Tin Plate Company, Pittsburgh, Pa.
National Tin Plate Company, Anderson, Ind.
National Tin Plate Company, Monessen, Ind.
New Castle Steel & Tin Plate Company, New Castle,
Pa.
Pennsylvania Tin Plate Company, New Kensington,
Pa.
Pittsburgh Tin Plate Company, New Kensington, Pa.
Shenango Valley Steel Company, New Castle, Pa.
Star Tin Plate Company, Pittsburgh, Pa.
United States Iron & Tin Plate Mfg. Company,
Demmler, Pa.
Wallace, Banfield & Co., Irondale, Ohio.
Washington Steel & Tin Plate Mills, Washington, Pa.
Atlanta Steel & Tin Plate Company, Atlanta, Ind.
Baltimore Tin Plate Company, Baltimore, Md. (Dis-
mantled.)
Blairsville Rolling Mill & Tin Plate Company, Blair-
sville, Pa.
Cincinnati Rolling Mill & Tin Plate Company, Cin-
cinnati, Ohio.
Cumberland Steel & Tin Plate Company, Cumber-
land, Md.
Ellwood Tin Plate Company, Ellwood City, Pa.
Great Western Tin Plate Company, Joliet, Ill.
Hamilton & Co., West Newton, Pa.
Johnstown Tin Plate Company, Johnstown, Pa.
Laughlin Nail Company, Martin's Ferry, Ohio.
Marshall Bros. & Co., Philadelphia, Pa.
The Morewood Company, Gas City, Ind.
Morton Tin Plate Company, Cambridge, Ohio.
Neshannock Sheet & Tin Plate Company, New Castle,
Pa.
Ohio River Sheet & Tin Plate Company, P. O., Ag-
new, Pa.
Reeves Iron Company, Canal Dover, Ohio.

The company have acquired all the plants and machinery, exclusive of realty, used for manufacturing tin plate of the following companies:
 Aetna-Standard Iron & Steel Company, Bridgeport, Ohio.

Britton Rolling Mill Company, Cleveland, Ohio. (Dismantled.)

Somers Bros., Brooklyn, N. Y. (Dismantled.)

Stickney Iron Company, Baltimore, Md. (Dismantled.)

Products:

Tin plate.
 Terne plate.
 Black plate.

Headquarters:

Battery Park Building, New York.

Executive Committee:

William B. Leeds, chairman.
 Daniel G. Reid.
 Warner Arms.
 William T. Graham.
 William H. Moore.

Board of Directors:

D. G. Reid.	C. A. Robinson.
W. B. Leeds.	Jas. B. Dill.
W. H. Moore.	W. E. Reis.
J. H. Moore.	F. S. Wheeler.
W. T. Graham.	J. A. Matthews.
Warner Arms.	R. R. Quay.
Jas. McLean.	George Green.

Executive Officers:

D. G. Reid, president.
 W. T. Graham, first vice-president.
 Warner Arms, second vice-president.
 W. M. Leeds, third vice-president.
 F. S. Wheeler, treasurer.
 E. G. Applegate, secretary.
 H. B. Wheeler, assistant secretary.

Managers of Plants:

District Managers:

George Greer, New Castle, Pa.
 William Banfield, Beaver, Pa.
 J. R. Phillips, Pittsburgh, Pa.
 C. A. Robinson, Wheeling, W. Va.
 Geo. G. Humbert, Connellsville, Pa.
 Berthold Goldsmith, Elwood, Ind.

Engineering Department:

C. W. Bray, chief engineer, Carnegie Building, Pittsburgh.

Sales Agents or Offices at Home and Abroad:

Frank Dickerson, New York.
 W. H. Wells, San Francisco.
 C. M. Stuart, Chicago.

Purchasing Agent:

L. H. Landon, New York.

New York Territory: Headquarters:

Battery Park Building.

Pittsburgh Territory: Headquarters:

Carnegie Building.

Bethlehem Steel Company.

Title:

Bethlehem Steel Company.

Date of Organization:

April 20, 1899.

Capital Stock Authorized:

\$15,000,000.

Capital Stock Issued:

\$15,000,000.

No preferred stock.

Dividends Declared and Dates Thereof:

ON COMMON.

4 per cent. per annum, payable quarterly, March 1,
 June 1, September 1, December 1.

Registrar of Stock:

The Pennsylvania Company for Insurance on Lives
 and Granting Annuities, Philadelphia, Pa.

Transfer Agents:

Drexel & Co., Philadelphia, Pa.

Properties and Plants Owned:

Plant leased from the Bethlehem Iron Company.

Products:

Pig iron.
 Merchant steel bars, billets.
 Muck bar.
 Forgings.
 Guns.
 Armor plate.

Productive Capacity:

Pig iron, 150,000 tons per year.
 Merchant steel bars and billets, 40,000 tons per year.
 Muck bar, 10,000 tons per year.
 Forgings, including gun forgings, 50,000,000 pounds
 per year.
 Armor plate, 6000 tons per year.

Headquarters:

South Bethlehem, Pa.

Executive Committee:

Joseph Wharton.
 Elisha Wilbur.
 Edward T. Stotesbury.

Board of Directors:

Robert P. Linderman.
 Joseph Wharton.
 Beauveau Borie.
 Elisha P. Wilbur.
 Robert H. Sayre.
 John Lowber Welsh.
 Edward T. Stotesbury.

Executive Officers and Managers of Plants:

Robert P. Linderman, president.
 E. M. McIlvaine, vice-president.
 Abraham S. Schropp, secretary.
 C. O. Brunner, treasurer.
 R. W. Davenport, general superintendent.
 Archibald Johnson, assistant general superintendent.

Sales Agents or Offices at Home and Abroad:

A. E. Borie, South Bethlehem, Pa.
 H. F. J. Porter, South Bethlehem, Pa.
 E. J. Krause, South Bethlehem, Pa.
 F. H. Brunner, South Bethlehem, Pa.
 W. H. Mitchell, 100 Broadway, New York City.
 R. R. Haydock, 421 Chestnut street, Philadelphia, Pa.
 E. Nelson, 1433 Marquette Building, Chicago, Ill.
 Walter Miller, 312 Perry-Payne Building, Cleveland,
 Ohio.
 J. K. Rugg & Co., 340 Main street, Cincinnati, Ohio.
 J. P. Larkins, 430 Endicott Building, St. Paul, Minn.
 C. S. Burt & Co., 726 Gravier street, New Orleans, La.
 C. S. Burt, 4 Bank Block, Denver, Col.
 F. W. Riches, Atlanta Technical Agency, St. Petersburg,
 Russia.

Purchasing Agent:

William M. Tobias, South Bethlehem, Pa.

Cambria Steel Company.

Title :

Cambria Steel Company.

Date of Organization :

November 14, 1898.

Capital Stock Authorized :

\$16,000,000.

Capital Stock Issued :

\$16,000,000. \$10.50 per share paid.

Bonded Indebtedness :

Assumed the payment of \$2,000,000, 5-20 debenture bonds, issued by Cambria Iron Company, July 1, 1897, of which but \$218,200 are outstanding at this date, \$1,781,800 having been purchased and canceled.

Dividends Declared and Dates Thereof :

ON COMMON.

- No. 1, April 19, 1899, paid May 15, 1899, 40 cents per share, cash.
- No. 2, July 6, 1899, paid August 15, 1899, 60 cents per share, cash.
- No. 3, September 28, 1899, paid November 15, 1899, \$2.50 per share, cash.
- No. 4, January 12, 1900, paid February 15, 1900, 50 cents per share, cash.
- No. 4, extra, January 12, 1900, paid February 1, 1900, \$1.50 per share, to pay third instalment on capital stock.
- No. 5, April 18, 1900, paid May 15, 1900, 50 cents per share, cash.
- No. 5 extra, April 18, 1900, paid May 1, 1900, \$4.50 per share, to pay fourth instalment on capital stock.
- No. 6, July 18, 1900, paid August 15, 1900, 50 cents per share, cash.
- No. 7, October 17, 1900, paid November 15, 1900, 50 cents, cash.
- Assessment \$1.50 per share, paid December 1, 1900.

Registrar of Stock :

The Pennsylvania Company for Insurances on Lives and Granting Annuities, 517 Chestnut street, Philadelphia.

Transfer Agents :

Company's office, Harrison Building, Philadelphia.

Properties and Plants Owned :

Lessee of

Cambria Iron Company, Johnstown, Pa.,
who owns

- Atlas & Mahoning Coke Plants, Dunbar, Pa.
- Penn Iron Mining Company's mines, Dickinson County, Mich.
- One-half interest in Mahoning Ore & Steel Company's mines, Hibbing, Minn.
- One-half interest in Naginey Quarry Company, Limited, Tyrone, Pa.
- Five-eighths interest in Juniata Limestone Company, Limited, Cove Forge, Pa.

Products :

- Steel T rails (8 to 150 pounds per yard).
- Splice bars, bolts and nuts.
- Frog fillers, tee rail guards.
- Slabs, blooms, billets, bars, forgings, &c.
- Structural steel: Beams, angles, channels, zees, tees, flats, rounds, squares, &c.
- Axles for passenger cars, freight cars and locomotives, crank pins, piston rods, &c.

Gautier Department.

For products of Gautier Department address "Johnstown, Pa." or "Bourse Building, Philadelphia, Pa." or New York, Chicago, Cincinnati or Atlanta offices.

Merchant bar steel: Including tire, toe calk, machinery, carriage spring, railroad spring, hoe, rake, fork steel, &c.

Agricultural steel and shapes: Finger bars, Knife backs, rake teeth, bundle carrier teeth, tedder forks and springs, spring harrow teeth, harrow (drag) teeth, seat springs, &c.

Plow steel: Flat and finished plow shapes, digger blades, slabs (Penn and Pernot), hammered lay, rolled lay, &c.

Cold rolled steel shafting, steel harrow discs. Cambria link barb wire.

Productive Capacity :

500,000 tons of finished steel per annum.

Improvements or Additions Under Way :

- Additional open hearth plant.
- 6 50-ton furnaces.
- 40-inch blooming and billet mill.
- 34-inch slabbing train.

Headquarters :

Main office address, Philadelphia, Pa., Eighth Floor, Harrison Building (opposite P. R. R. Terminal Station).

Executive Committee :

- John Lowber Welsh, chairman.
- Josiah M. Bacon.
- Robert F. Kennedy.

Board of Directors :

- Josiah M. Bacon.
- Robert F. Kennedy.
- Charles S. Price.
- David Reeves.
- Powell Stackhouse.
- Edward T. Stotesbury.
- John W. Townsend.
- John Lowber Welsh.
- R. Francis Wood.

Executive Officers and Managers of Plants :

- Powell Stackhouse, president.
- John W. Townsend, vice-president.
- John Lowber Welsh, second vice-president.
- William S. Robinson, secretary and treasurer.
- Alex. P. Robinson, assistant secretary and treasurer.
- Charles S. Price, general manager.

Sales Agents or Offices at Home and Abroad :

- New York, 71 Broadway.
- Chicago, 209 Western Union Building.
- Cincinnati, Union Trust Building.
- St. Louis, 1514 Chemical Building.
- Cleveland, Perry-Payne Building.
- Pittsburgh, 818 Park Building.
- Boston, 70 Kilby street.
- Atlanta, 413-414 Austell Building.
- Detroit, 49 Newberry Building.
- Toledo, 316 The Nasby.
- Baltimore, 310-12 North street.

The Carnegie Company.

Title :

The Carnegie Company.

Date of Organization :

March 24, 1900.

Capital Stock Authorized :

Bonds\$160,000,000
 Stock\$160,000,000
 (\$1000 par.)

Capital Stock Issued :

\$156,800,000

Bonded Indebtedness :

Collateral trust, 5 per cent., 100 year gold bonds, dated April 2, 1900, maturing April 1, 2000. Sinking fund, \$800,000 per annum, after April, 1905, bonds for sinking fund being subject to call at 105 and interest.....\$160,000,000

Collateral.	Total shares.	Shares pledged.
Carnegie Steel Company.....	500,000	500,000
H. C. Frick Coke Company....	200,000	200,000
Carnegie Natural Gas Company.	6,000	6,000
Union Railroad Company.....	40,000	40,000
Youghiogheny Northern Railroad Company.....	8,000	8,000
Pittsburgh, Bessemer & Lake Erie Railroad, common.....	200,000	110,010
Pittsburgh, Bessemer & Lake Erie Railroad, preferred.....	30,000	10,002
Oliver Iron Mining Company..	12,000	10,000
Pewabic Company.....	8,000	4,000
Pittsburgh Steamship Company	4,820	4,016 2-3
Pittsburgh, Conneaut Dock Company	1,000	1,000
Mingo Coal Company.....	10	10
Youghiogheny Water Company.	1,000	1,000
Mount Pleasant Water Company	3,000	3,000
Trotter Water Company.....	5,000	5,000
Pittsburgh Limestone Company.	60,000	45,000
Union Supply Company, Limited	75,000	75,000

Headquarters :

Carnegie Building, Pittsburgh.

Board of Directors :

Henry Phipps.	Chas. M. Schwab.
George Lauder.	William H. Singer.
Lawrence C. Phipps.	Thomas Morrison.
Daniel M. Clemson.	James Gayley.
Thomas Lynch.	James B. Dill.
A. M. Moreland.	

Executive Officers and Managers of Plants :

Chas. M. Schwab, president.
 Lawrence C. Phipps, vice-president.
 William W. Blackburn, secretary.
 William W. Blackburn, treasurer.

Properties and Plants Owned :

Carnegie Steel Company:
 Chas. M. Schwab, president.
 Alexander R. Peacock, first vice-president.
 Lawrence C. Phipps, second vice-president.
 William W. Blackburn, secretary.
 James J. Campbell, assistant secretary.
 Lawrence C. Phipps, treasurer.
 W. C. McCausland, assistant treasurer.
 Owning Edgar Thomson Steel Works, Bessemer, Pa.;
 9 blast furnaces, 4 15-ton Bessemer steel converters and 2 rail mills.

Duquesne Steel Works, Cochran, Pa.; 4 blast furnaces, Bessemer steel plant, open hearth steel plant, 12 50-ton furnaces, 2 billet mills, angle bar mill, continuous bar mill.

Carrie furnaces; 2 completed blast furnaces, 2 blast furnaces building.

Lucy furnaces; 2 completed blast furnaces.

Homestead Steel Works; Bessemer plant, 40 open hearth furnaces, 4 blooming mills, 4 structural trains, 2 slabbing mills, 4 plate mills, 1 3000-ton and 1 10,000-ton press.

Howard Axle Works.

Lower Union Mills.

Upper Union Mills.

H. C. Frick Coke Company, Scottdale, Pa.:

Thomas Lynch, president.

W. C. Magee, vice-president.

Giles B. Bosworth, vice-president.

Giles B. Bosworth, treasurer.

M. M. Bosworth, secretary.

Own 40,000 acres of coal lands, 20,000 acres of surface lands and 11,652 coke ovens in Westmoreland and Fayette counties, Pa. Own 2628 railroad cars; market production of 1600 outside ovens.

Carnegie Natural Gas Company:

Lease 98,000 acres gas territory in Allegheny, Washington, Armstrong and Westmoreland counties, Pa., and Wetzel and Doddridge counties, W. Va., 130 producing wells and 3000 miles main and branch pipe lines.

Union Railroad Company:

Own 39.52 miles and lease 12.61 miles of track.

Pittsburgh & Conneaut Dock Company:

Operate docks on Pittsburgh, Bessemer & Lake Erie at Conneaut. Also own 42.6 per cent. of stock of Pennsylvania & Lake Erie Dock Company, and 25 per cent. of stock of New York, Pennsylvania & Ohio Dock Company.

Trotter Water Company:

Pumping plant on Youghiogheny River, 1½ miles above Connellsville, Pa.

Youghiogheny Northern Railway Company:

Line from Broad Ford to Summit, Fayette County, 2.4 miles, leased to Pittsburgh, McKeesport and Youghiogheny Railroad.

Youghiogheny Water Company:

Pumping plant at Broad Ford, Pa.

Mount Pleasant Water Company:

Pumping plant at Bridgeport, Fayette County, Pa.

Pittsburgh, Bessemer & Lake Erie Railroad:

Operate 203.31 miles of railroad between Conneaut, Ohio; Erie, Pa., and North Bessemer, Pa.

Oliver Iron Mining Company:

Own Metropolitan Iron & Land Company (Norrie, Aurora and Tilden mines, Gogebic), 89.3 per cent. of stock of Lake Superior Iron Company (Mountain Iron, Mesaba), 98 per cent. of stock of Security Land & Exploration Company. Estimated output of mines, 5,000,000 tons.

Pittsburgh Steamship Company:

Own 11 steamships and 2 tugs.

Pittsburgh Limestone Company, Limited:

Operate quarries at Tyrone and Williamsburg, Blair County, and Wick, Butler County, Pa. Daily capacity, 4500 tons.

Products :

Pig iron.
 Coke.
 Spiegeleisen.
 Ferromanganese.
 Steel billets, blooms and slabs.

Tin plate and sheet bars.
Steel rails.
Angle bars.
Structural steel.
Beams.
Angles.
Plates.
Forgings.
Axles.
Links and pins.

Sales Agents or Officers at Home and Abroad :

Atlanta, Ga., Equitable Building.
Boston, Mass., 125 Milk street.
Buffalo, N. Y., 451 Main street.
Chicago, Ill., 1021 Marquette Building.

Cincinnati, Ohio, 104 West Fourth street.
Cleveland, Ohio, 103 Superior street.
Denver, Col., People's Bank Building.
Detroit, Mich., Union Trust Building.
Minneapolis, Minn., Guaranty Building.
New York, N. Y., 71 Broadway.
Philadelphia, Pa., Harrison Building.
St. Louis, Mo., 72 Oliver street.
San Francisco, Cal., 258 Market street.
London, England, 71 and 72 King William street.
Montreal, Canada, Bell Telephone Building.
City of Mexico, Mexico, Apartado No. 924.
St. Petersburg, Russia, 3 Kazan Plain.

Purchasing Agents :

Pittsburgh office.

Central Foundry Company.

Title :

Central Foundry Company.

Date of Organization :

April 15, 1899, under laws of New Jersey.

Capital Stock Authorized :

Preferred (rate of interest, 7 per cent.,
cumulative)\$7,000,000
Common (par, \$100)..... 7,000,000

Capital Stock Issued :

Preferred \$7,000,000
Common 7,000,000

Bonded Indebtedness :

\$4,000,000, 6 per cent.

Dividends Declared and Dates Thereof :

None. ON PREFERRED.
None. ON COMMON.

Registrar of Stock :

State Trust Company, New York City.

Transfer Agents :

Baring, Magoun & Co., New York City.

Properties and Plants Owned :

Monitor Iron Works, Newark, N. J.
Monitor Iron Works, Sing Sing, N. Y.
Cassidy & Adler, New York.
Henry McShane Mfg. Company, Baltimore, Md.
J. Regester & Sons, Baltimore, Md.
C. A. Blessing, Salem, N. J.
Phoenix Foundry & Mfg. Company, Lansdale, Pa.
Midvale Foundry Company, Allentown, Pa.
Wilmington Foundry Company, Wilmington, Del.
A. L. Swett Iron Works, Medina, N. Y.
Bignall Mfg. Company, Medina, N. Y.
Beach & Co., Medina, N. Y.
St. Charles Mfg. Company, St. Charles, Ill.
Rundle & Spence Mfg. Company, Milwaukee, Wis.
Hoffman, Billings & Weller Company, Gadsden, Ala.
Bell Mfg. Company, Vincennes, Ind.
Alabama Pipe Company, Bessemer, Ala.
Kingsley Foundry Company, Hammond, Ind.
E. L. Tyler & Co., Anniston, Ala.
Shuster Foundry, South Pittsburg, Tenn.

Equipment Only :

J. L. Mott Iron Works, New York.
Illinois Malleable Iron Company, Chicago, Ill.
A. Y. Macdonald & Morrison Company, Dubuque,
Iowa.
Humphreys Mfg. Company, Mansfield, Ohio.
Ahrens & Ott Mfg. Company, Louisville, Ky.

Products :

Soil pipe and soil pipe fittings.
Plumbers' cast iron goods.

Productive Capacity :

20 active plants, daily capacity from 10 tons finished
product per day to 75 tons per day, the smallest
producing 10 tons, the largest 75 tons per day.

Headquarters :

116 Nassau street, New York City.

Executive Committee :

John Reid.
Alfred Fowle, Jr.
Charles Smithers.
A. H. Henderson.
G. Schumacher.

Board of Directors :

John Reid.
Alfred Fowle, Jr.
G. Schumacher.
W. L. Rogers.
R. A. Regester.
George F. Crane.
Charles Smithers.
George D. Hallock.
A. H. Henderson.
C. B. Alexander.
Charles R. Schmidt.
A. L. Swett.

Executive Officers :

John Reid, president, New York.
Alfred Fowle, Jr., first vice-president and general
manager.
Geo. F. Ross, assistant general manager.
G. Schumacher, secretary.
Winthrop L. Rogers, treasurer.

Managers of Plants :

A. L. Swett, Beach, Bignall and Swett plants, Me-
dina, N. Y.
J. J. Beggs, Bessemer plant.
J. T. Weller, H., B. & W. plants.
J. F. Moore, Monitor I plant.
H. A. Decker, Monitor II plant.
C. R. Schmidt, McShane and Regester plants.
P. H. Rahe, Phoenix plant.
Jos. Lodge, Shuster plant.
E. L. Tyler, Tyler plant.
L. O. Allen, Vincennes plant.

Sales Agents or Offices at Home and Abroad :

E. A. Keithley, Pacific Coast representative.
P. J. Adami, C. W. Bager, traveling salesmen.
C. C. Todd, representative at Chicago.

Purchasing Agent :

W. S. Reins.

Board of Directors :

John C. Osgood, Denver.
 Henry R. Wolcott, Denver.
 J. A. Kebler, Denver.
 John L. Jerome, Denver.
 A. C. Cass, Denver.
 D. C. Beaman, Denver.
 John T. Kebler, Denver.
 Dennis Sullivan, Denver.
 W. H. James, Denver.
 James B. Grant, Denver.
 Ernst Thalmann, New York City.
 Jos. E. Heimerdinger, New York City.
 Ben T. Cable, Rock Island, Ill.

Executive Officers and Managers of Plants :

John C. Osgood, president, Denver.
 Henry R. Wolcott, first vice-president, Denver.
 J. A. Kebler, second vice-president and general manager, Denver.
 A. C. Cass, third vice-president, Denver.

John L. Jerome, treasurer, Denver.

D. C. Beaman, secretary and general attorney, Denver.

J. F. Welborn, general sales agent, Denver.

C. S. Robinson, general superintendent iron and steel department, Denver.

John T. Kebler, general superintendent fuel department, Denver.

Sales Agents or Offices at Home and Abroad :

J. F. Welborn, general sales agent, Denver.

H. C. Harmon, assistant general sales agent, fuel department, Denver.

W. A. Wetmore, assistant general sales agent, iron department, Denver.

C. E. Phelps, division sales agent, 71 Broadway, New York.

Jos. Chlberg, division sales agent, El Paso, Texas.

F. J. de Vry, division sales agent, Salt Lake, Utah.

Purchasing Agent :

S. G. Pierson, Denver, Col.

Crucible Steel Company of America.

Title :

Crucible Steel Company of America.

Date of Organization :

July 21, 1900.

Capital Stock Authorized :

Preferred\$25,000,000
 Common\$25,000,000

Capital Stock Issued :

Preferred\$24,399,500
 Common\$24,410,900

Bonded Inbtedness :

None.

Dividends Declared and Dates Thereof :

ON PREFERRED.
 1¾ per cent. December 29, 1900.
 ON COMMON.
 Just organized.

Registrar of Stock :

Fidelity Title & Trust Company of Pittsburgh, Pittsburgh, Pa.
 The Farmers' Loan & Trust Company, New York City.

Transfer Agents :

The Union Trust Company of Pittsburgh, Pittsburgh, Pa.

Properties and Plants Owned :

Black Diamond Steel Works, Pittsburgh, Pa.
 Crescent Steel Works, Pittsburgh, Pa.
 Singer, Nimick & Co., Incorporated, Pittsburgh, Pa.
 Howe, Brown & Co., Limited, Pittsburgh, Pa.
 La Belle Steel Works, Allegheny, Pa.
 Anderson, Dupuy & Co., McKee's Rocks, Pa.
 Aliquippa Steel Works, Aliquippa, Beaver County, Pa.
 Benjamin, Atha & Illingworth Company, Harrison, N. J. (The Newark plant is not included.)
 Spaulding & Jennings Company, Jersey City, N. J.
 Sanderson Brothers Steel Company, Syracuse, N. Y.
 Beaver Falls Steel Works, Beaver Falls, Pa.
 Cumberland Steel & Tin Plate Company, Cumberland, Md.
 Burgess Steel & Iron Works, Portsmouth, Ohio.

Products :

Crucible, open hearth and Bessemer steel.
 Copper.
 Springs.

Agricultural implement steel.

Track tools.

Productive Capacity :

300,000 tons.

Improvements and Additions Under Way :

Undetermined.

Headquarters :

Empire Building, Pittsburgh, Pa.

Executive Committee :

Wm. G. Park.
 Benjamin Atha.
 R. E. Jennings.
 C. H. Halcomb.
 Reuben Miller.
 James W. Brown.
 Herbert Dupuy.

Board of Directors :

Wm. G. Park.
 James H. Park.
 Benjamin Atha.
 Robt. E. Jennings.
 C. H. Halcomb.
 Reuben Miller.
 J. W. Brown.
 H. Dupuy.
 Frank B. Smith.
 Wm. H. Singer.
 Alexander Thomas.
 S. D. York.
 H. H. Dickey.
 J. M. May.
 G. B. Harton.
 A. W. Mellon.

Executive Officers and Managers of Plants :

Wm. G. Park, chairman of board.
 C. H. Halcomb, president and general manager.
 James W. Brown, first vice-president.
 Benjamin Atha, second vice-president.
 Robert E. Jennings, third vice-president.
 Reuben Miller, treasurer.
 Julius Bieler, assistant treasurer.
 P. B. Gaynor, auditor.
 Frank B. Smith, secretary.

Purchasing Agent :

W. M. Hamilton.

Diamond State Steel Company.

Title:

Diamond State Steel Company.

Date of Organization:

April 21, 1899.

Capital Stock Authorized:

Common (par, \$10).....\$3,000,000

Capital Stock Issued:

Paid in \$5 per share.

Bonded Indebtedness:

None.

Dividends Declared and Dates Thereof:

ON COMMON.

January 19, 1900, 4 per cent.; July 21, 1900, 4 per cent.

Financial Statement:

BALANCE SHEET, JUNE 30, 1900.

Assets.

Cost of property and improvements.....	\$786,605
Rolls, patterns, patent rights, &c.....	157,944
Bills receivable.....	26,699
Investment account.....	52,021
Cash in bank.....	68,639
Accounts receivable.....	302,390
Raw and finished stock per inventory....	406,095
Total	\$1,800,395

Liabilities.

Capital stock.....	\$1,500,000
Accounts payable.....	198,849
Profit and loss surplus.....\$201,546	
Less:	
Annual rental or dividend Dia-	
mond State Iron Company..	40,000
Dividend paid January 19, 1900.	60,000
	<u>101,546</u>
Total	\$1,800,395

Registrar of Stock:

Investment Company, Philadelphia.

Transfer Office:

Real Estate Trust Building, Philadelphia.

Properties and Plants Owned:Diamond State Iron Company, Wilmington, Del.
Leased for 999 years at 4 per cent. on capital stock of \$1,000,000, payable semi-annually, May 1 and November 1.

New Open Hearth Steel Plant, consisting of five 50-ton furnaces and blooming mill, with 40 acres of land on tidewater at Wilmington, Del.

Products:Steel billets.
Splice bars.
Track bolts.
Spikes.
Bolts and nuts.
Washers.
Rivets.
Merchant bar.
Horseshoe iron.
Horse shoes.
Forgings.
Castings.**Productive Capacity:**135,000 tons open hearth steel per annum.
60,000 tons finished iron and steel per annum.**Improvements and Additions Under Way:**

Various additions and improvements to mills and shops.

Headquarters:

Wilmington, Del.

Board of Directors:

E. B. Smith.	E. R. Dick.
Henry Tatnall.	G. W. Norris.
Edward Wolf.	H. T. Wallace.
W. M. Gorham.	

Executive Officers and Managers of Plants:H. T. Wallace, president, Wilmington, Del.
L. A. Bower, vice-president, New York.
W. E. Boughton, treasurer, Philadelphia.
W. H. Wallace, secretary, Wilmington, Del.
Edwin H. Martin, general superintendent.**Sales Agents or Offices at Home and Abroad:**

New York office, 29 Broadway.

Empire Steel & Iron Company.

Title:

Empire Steel & Iron Company.

Date of Organization:

March, 1899, under laws of New Jersey.

Capital Stock Authorized:Preferred (rate of interest, 6 per cent., payable semi-annually, cumulative)..... \$5,000,000
Common (par, \$100)..... \$5,000,000**Capital Stock Issued:**Preferred \$2,368,100
Common \$2,281,400**Bonded Indebtedness:**

None.

Dividends Declared and Dates Thereof:

ON PREFERRED.

At rate of 6 per cent. per annum on preferred stock
July 1, 1899, and January 1, 1900, July 2, 1900.
1½ per cent. January 1, 1901.

ON COMMON.

None.

Financial Statement June 30, 1900.

Assets	\$5,933,974.69
All liabilities, except capital stock.....	795,639.19
Capital stock	4,649,500.00
Surplus at credit of profit and loss.....	488,835.50
	<u>\$5,933,974.69</u>

Transfer Agents:

City Trust Company of New York.

Properties and Plants Owned:Mount Hope Mining Company, ore mines, Mount Hope, N. J.
Mount Hope Mineral Railroad, Port Oram, N. J.
Crane Iron Works, Catasauqua, Pa., 4 furnaces.
Greensboro Furnace, Greensboro, N. C., 1 furnace.
Ore Hill Ore Mines, Ore Hill, N. C.
Valentine Furnace, Bellefonte, Pa., leased, 1 furnace.
Henry Clay Furnaces, Reading, Pa., 2 furnaces.
Macungie Furnace, Macungie, Pa., 1 furnace.
Oxford Furnace, Oxford, N. J., 1 furnace.
Oxford Ore Mines, Oxford, N. J.

Topton Furnace, Topton, Pa., 1 furnace.
 Victoria Furnace, Goshen, Va., 1 furnace.
 Victoria & Western Railroad, Goshen, Va.
 Shenandoah Furnace, Shenandoah, Va., 1 furnace.
 Potts Valley Ore Mines, Huddleston, Va.
 Huddleston Railroad, Huddleston, Va.
 Boyer Ore Mines, Fox Mountain Ore Mines, Massanutton Ore Mines, near Shenandoah, Va.
 Craigsville Limestone Quarry, Craigsville, Va.

Products:

Pig iron: Bessemer, low phosphorus Bessemer, basic, foundry and forge irons.

Productive Capacity:

1000 tons per day.

Improvements and Additions Under Way:

Repairs and improvements to Topton, Shenandoah and Victoria Furnaces. Development of mining operations at all mines and increasing output of ores, opening new ore mines and building railroad to Massanutton range, in Virginia near Shenandoah.

Headquarters:

General offices, Catasauqua, Pa.
 New York office, 71 Broadway.

Executive Committee:

Archer Brown, chairman.
 E. R. Chapman.
 W. L. Sims.

Board of Directors:

Archer Brown.	F. M. Davis.
Leonard Peckitt.	Glen Wright.
E. R. Chapman.	W. L. Sims.
E. K. Summerwell.	W. E. Scarrett.
F. M. Jeffery.	

Executive Officers and Managers of Plants:

Archer Brown, chairman Executive Committee.
 Leonard Peckitt, president.
 F. M. Davis, vice-president.
 W. L. Sims, general manager and treasurer.
 Glen Wright, secretary.
 J. M. Fitzgerald, assistant secretary.
 Sheldon Norton, general superintendent.

Division Superintendents:

Howard Knauss, Catasauqua, Pa.
 R. L. Ahles, Oxford, N. J.
 Duke Peckitt, Mount Hope, N. J.
 W. B. Foote, Reading, Pa.
 W. H. Clymer, Topton and Macungie, Pa.
 J. H. Ferguson, Goshen, Va.
 J. H. Carpenter, Huddleston, Va.

Sales Agents or Offices at Home and Abroad:

Rogers, Brown & Co., and
 Rogers, Brown & Warner.

Purchasing Agent:

W. A. Major.

Federal Steel Company.

Title:

Federal Steel Company.

Date of Organization:

September 9, 1898.

Capital Stock Authorized:

Preferred, 6 per cent. preference, non-cumulative	\$100,000,000
Common	100,000,000
Total	\$200,000,000

Capital Stock Issued:

Preferred	\$53,260,900
Common	46,484,300
Total	\$99,745,200

Bonded Indebtedness:

The Federal Steel Company have no bonded indebtedness. The companies whose entire capital stocks they own have bonds outstanding in the hands of the public as follows:

Duluth & Iron Range Railroad Company's Bonds:

First mortgage (interest, April and October), 5 per cent., due October 1, 1937...	\$6,732,000
Second mortgage (interest, January and July), 6 per cent., due January 1, 1916..	1,000,000
Amount issued.....	\$4,500,000
Less, owned by Minnesota Iron Company (parent company)...	3,500,000
Balance	\$1,000,000
Total	\$7,732,000

Elgin, Joliet & Eastern Railway Company's Bonds:

First mortgage (interest, May and November), 5 per cent., due May 1, 1941.....	7,852,000
--	-----------

Lorain Steel Company (of Pennsylvania), Bonds — formerly Johnson Company of Pennsylvania:

First mortgage (interest, March and September), 6 per cent., due March 1, 1914, but \$100,000 are retired annually under sinking fund provision.....	1,400,000
Total mortgage bonds.....	\$16,984,000

Illinois Steel Company's Debentures:

Convertible debentures (interest, January and July), 5 per cent., due January 1, 1910	\$2,922,000
Original issue was.....	\$6,200,000
Less, retired.....	3,278,000
Balance, \$2,922,000, outstanding, being stamped waiving the "convertible" clause.	
Non-convertible debentures (interest, April and October), 5 per cent., due April 1, 1913	6,900,000
Total debenture bonds.....	\$9,822,000

Interest on foregoing bonds and debentures is payable at offices of the respective companies, 71 Broadway, New York, except that on Lorain Steel Company's bonds, which is payable at office of United States Trust Company, New York.

Financial Statement:**Statement of Net Earnings to December**

31, 1899:	
Net earnings of the Federal Steel Company and constituent companies for the calendar year 1899.....	\$10,592,842.91
Less charged for new construction, improvements, renewals and replacements	\$1,234,045.82

For reserve funds, depreciation	901,136.65
For premiums on bonds purchased	153,995.54
	<hr/> 2,289,178.01
Total	\$8,303,664.90
Add net profits accrued during 1898, subsequent to the time the Federal Steel Company acquired ownership of stock of constituent companies.....	1,214,679.80
Total net profits to December 31, 1899	\$9,518,344.70
Dividends for 1899 on Federal Steel Company stock: Preferred, 6 per cent.; common, 1¼ per cent., paid January 20, 1900; common, 2½ per cent., payable March 20, 1900.....	4,938,702.75
Surplus	\$4,579,641.95

Dividends Paid and Dates Thereof :

On preferred, 6 per cent. On common, 1¼ per cent.
January 20, 1900; 2½ per cent. March 20, 1900.

Registrar of Stock :

Colonial Trust Company, New York.

Transfer Agents:

Corporation Trust Company, New York and Jersey City, N. J.

Properties and Plants Owned :

The Federal Steel Company own the entire issues of the capital stocks of the following companies, viz.:
Minnesota Iron Company.
Illinois Steel Company.
Lorain Steel Company of Ohio.
Lorain Steel Company of Pennsylvania.
Elgin, Joliet & Eastern Railway Company.

The several properties owned or controlled by the foregoing companies may be briefly described as follows:

Iron Ore Properties:*By Minnesota Iron Company :*

150,300 acres of mineral lands in Minnesota and Michigan, on which are located various iron mines, the following named being now in active operation:
Minnesota.
Auburn.
Fayal.
Genoa.
Elba.
Chandler.

By Illinois Steel Company :

The Cundy mine at Quinnesec, Mich.; the Josnton mine at Crystal Falls, Mich; four-fifths interest in 1080 acres of ore lands at Iron Range, Dodge County, Wis.; 5908 acres of mineral lands in Michigan.

Coke and Coal Properties:

The property of the S. W. Connellsville Coke Company, consisting of 1650 acres of coking coal land near Mt. Pleasant, Pa., with a plant thereon of 1217 ovens.

About 6000 acres of coking coal lands in Fayette County, Pa., with three coking plants thereon aggregating 1200 ovens, together with a railroad (Mason-town & New Salem Railroad) connecting the several coking plants.

4400 acres of coking coal land in Raleigh County, W. Va.

904 acres of coal land near Johnstown, Pa.

Steel Works :*By Illinois Steel Company :*

Works located at South Chicago, Ill.; Bridgeport (Chicago), North Chicago Works (Chicago), Joliet, Ill., and Milwaukee, Wis., consisting in all of the following:
804 acres of land.

17 blast furnaces, excluding two now under construction.

10 open hearth furnaces.

3 steel mills.

2 rail mills

2 rod mills.

1 cotton tie mill.

1 slabbing mill.

1 plate mill.

2 merchant mills.

Steel and iron foundries.

Steel cement plant.

Power plants, laboratories, office buildings, &c.

By Lorain Steel Company :

Lorain, Ohio, plant, comprising the following:

975 acres of mill property.

Large office building.

2 blast furnaces (erected in 1899).

2 steel mills.

1 rail mill.

Power plants, laboratories, office buildings, &c.

Johnstown, Pa., plant, comprising the following:

150 acres of mill and other property.

Steel and iron foundries.

Machine and erecting shops for the manufacture of railway frogs, switches, crossings, special track work, electric railway motors, &c.

Railroad Property :*By Minnesota Iron Company :*

The Duluth & Iron Range Railroad, consisting of 175 miles of main line of railroad extending from the Minnesota Iron Company's and other mines in the Mesaba and Vermillion ranges in Minnesota, to the ore docks at Two Harbors on Lake Superior, and to Duluth, Minn.; also five large ore docks at Two Harbors and ample equipment for the transportation of 5,000,000 tons of iron ore per season and a large volume of other traffic.

By Illinois Steel Company :

The Chicago, Lake Shore & Eastern Railroad, consisting of 150.24 miles of tracks owned, connecting the several works of the Illinois Steel Company with intersecting lines of railroad; also trackage rights over 149.54 miles of other railroad.

By Elgin, Joliet & Eastern Railway Company :

196.47 miles of main line owned, and trackage rights over 16.36 additional miles, extending as follows: From Waukegan, Ill. (35 miles north of Chicago) southwesterly, south and easterly, to Porter, Ind., forming a Belt Line around Chicago and interesting every railroad entering there at an average distance of 30 miles therefrom; also, branches to Aurora, Ill., to the Wilmington coal fields, to Whiting, Ind. (Standard Oil Works), and to South Chicago, where extensive docks, warehouses and other terminals are owned; also extensive docks and terminals at Waukegan.

By Lorain Steel Companies :

The Lake Terminal Railroad and the Johnstown & Stony Creek Railway, owning respectively the terminal railroads connecting the steel works at Lorain, Ohio, and Johnstown, Pa., with intersecting lines of railroad.

Steamship and Dock Property :*By Minnesota Iron Company :*

The property of the Minnesota Steamship Company, consisting of twelve steel steamers and ten barges in commission on the great lakes.

A controlling interest in the property of the Minnesota Dock Company, consisting of valuable docks at Buffalo, N. Y., and at Ashtabula, Ohio.

Products :

Iron ore.

Coal.

Coke.

Pig iron (Bessemer and foundry).

Spiegeleisen and Ferro.
 Bessemer steel billets.
 Open hearth steel billets.
 Tee rails (heavy and light).
 Girder rails.
 Slabs and axle billets.
 Wire rods.
 Steel plates.
 Angle bars and rail joints.
 Tin plate bars.
 Bolts and nuts.
 Spikes.
 Merchant bars.
 Foundry products (for switch work consumption).
 Railway frogs, crossings, switches, motors, railway special work, &c.
 Portland cement.
 Steel cement.

Productive Capacity:

Iron ore, coal and coke (not including product of 1200 coke ovens now building) 5,000,000 tons
 Finished steel products..... 2,500,000 tons
 Cement 70,000 tons
 Railway frogs, crossings, switches, motors, track special work, &c., contingent on demand.

Production in 1899:

The production for the year of the several mining, coal and coke properties, furnaces and steel works owned by the constituent companies was as follows:

	Tons.
Iron ore mined	2,933,051
Coal mined (not including coal converted into coke)	98,692
Coke manufactured	847,525
Limestone quarried	57,134
Pig iron and spiegeleisen.....	1,569,277
(Equal to 11½ per cent. of the total production in the United States for the year.)	
Bessemer steel ingots.....	1,540,316
(Equal to 20 per cent. of total production in the United States for the year.)	
Open hearth steel ingots.....	181,496
Steel and iron foundry products.....	47,075
Steel rails	755,203
Other finished steel products.....	692,250
Steel cement	20,951
Mineral wool	736

Product of switch and motor works, a large quantity of railway frogs, switches, crossings, special track work, motors, &c.

Improvements and Additions Under Way:

The principal additions and improvements under way are as follows:

2 new blast furnaces, South Chicago Works.
 Additions to the equipment of the several railroads; also new second tracks and other sundry improvements.

Headquarters:

71 Broadway, New York City.

Executive Committee:

H. H. Porter.
 E. H. Gary.
 H. H. Rogers.
 Nathaniel Thayer.
 Samuel Spencer.

Board of Directors:

H. H. Porter, chairman.	Robert Bacon.
E. H. Gary.	Nathaniel Thayer.
J. Pierpont Morgan.	Marshall Field.
H. H. Rogers.	Samuel Mather.
D. O. Mills.	Norman B. Ream.
A. R. Flower.	Charles MacVeagh.
Samuel Spencer.	James Sim.
C. C. Cuyler.	

Executive Officers and Managers of Plants:

E. H. Gary, president.
 Edward Shearson, assistant to the president.
 Richard Trimble, secretary and treasurer.
 W. J. Filbert, auditor.

The business of each of the constituent companies of the Federal Steel Company is managed and conducted by the officers and directors of the respective companies. The officers of the several companies are as follows:

Illinois Steel Company:

E. J. Buffington, president.
 C. H. Foote, vice-president.
 T. J. Hyman, secretary.
 W. H. Thompson, treasurer.
 T. W. Robinson, general manager.
 Geo. Baker, general sales agent.
 L. D. Doty, purchasing agent.
 General offices, "The Rookery," Chicago.

Lorain Steel Company:

Daniel Coolidge, president and general sales agent.
 M. M. Suppes, vice-president and general manager, Lorain.
 P. Lavelle, general manager, Johnstown.
 P. M. Boyd, secretary.
 J. H. Craig, auditor.
 A. C. Gary, treasurer.
 J. K. Frye, purchasing agent.
 General offices, Lorain, Ohio.

Minnesota Iron Company:

D. H. Bacon, president.
 C. P. Coffin, secretary and treasurer.
 General offices, 303 Dearborn street, Chicago, Ill.

Elgin, Joliet & Eastern Railway Company:

C. H. Ackert, president and general manager.
 A. F. Banks, traffic manager.
 F. W. Sutton, auditor.
 F. D. Raymond secretary and treasurer.
 General offices, "The Rookery," Chicago, Ill.

Duluth & Iron Range Railroad Company:

J. L. Greatsinger, president.
 C. P. Coffin, secretary and treasurer.
 A. H. Vilele, auditor.
 General Offices, Duluth, Minn.

Sales Agents or Offices at Home and Abroad:

UNITED STATES.

Illinois Steel Company:

George Baker, general sales agent, "The Rookery," Chicago, Ill.
 C. C. Cluff, general Eastern agent, Empire Building, New York City.
 C. C. Harris, agent, Cuyahoga Building, Cleveland, Ohio.
 W. H. S. Wright, agent, Pioneer Press Building, St. Paul, Minn.
 R. B. Lyle, agent, Security Building, St. Louis, Mo.
 W. W. Bierce, agent, Hennan Building, New Orleans, La.
 S. W. Wheelock, agent, Denver, Col.

Lorain Steel Company:

Daniel Coolidge, general sales agent, Lorain, Ohio.
 H. C. Evans, agent, Empire Building, New York City.
 O. C. Evans, agent, Mitchell Building, Cincinnati, Ohio.
 W. W. Kingston, agent, Equitable Building, Atlanta, Ga.
 A. S. Littlefield, agent, Monadnock Building, Chicago, Ill.
 A. S. Littlefield, agent, Bank of Commerce Building, St. Louis, Mo.
 S. P. S. Ellis, agent, Penn Building, Pittsburgh, Pa.
 R. T. Lane, agent, Cuyahoga Building, Cleveland, Ohio.

Minnesota Iron Company:

Pickands, Mather & Co., agents, Cleveland, Ohio.

FOREIGN.

A. Holland, foreign manager, 29 Great St. Helen's, London, E. C., England.

Flint, Eddy & American Trading Company, agents, Shanghai, China.

Flint, Eddy & American Trading Company, agents, Yokohama, Japan

Flint, Eddy & American Trading Company, agents, Kobe, Japan.

Hasam & Moreno, agents, La Calle de las Damas, No. 5, City of Mexico, Mex.

Purchasing Agents:**Illinois Steel Company:**

L. D. Doty, purchasing agent, "The Rookery, Chicago, Ill.

Lorain Steel Company:

J. K. Frye, purchasing agent, Lorain, Ohio.

International Heater Company.

Title:

International Heater Company.

Date of Organization:

July 1, 1898.

Capital Stock Authorized:

Preferred (rate of interest, 7 per cent., cumulative)\$900,000
 Common (par, \$100).....\$900,000

Capital Stock Issued:

Preferred\$551,900
 Common\$543,900

Bonded Indebtedness:

None.

Dividends Declared and Dates Thereof:

Preferred, 5¼ per cent., July 1, 1898, to April 1, 1899, paid April 1, 1899; 3½ per cent., six months to October 1, 1899, paid October 1, 1899.

Registrar:

New York Security & Trust Company.

Properties and Plants Owned:

Howard Furnace Company, Syracuse, N. Y.
 J. F. Pease Furnace Company, Syracuse, N. Y.
 Russel, Wheeler & Son, Utica, N. Y.

Carton Furnace Company, Utica, N. Y.

Kernan Furnace Company, Utica, N. Y.

Products:

Warm air furnaces.
 Combination furnaces.
 Steam and hot water heaters.
 Heating stoves.
 Agricultural furnaces.
 Acetylene gas generators.

Headquarters:

Utica, N. Y.

Board of Directors:

Frank E. Wheeler, Utica.	J. F. Maynard, Utica.
Edward A. Carton, Utica.	W. S. Walcott, Utica.
Francis Kernan, Utica.	H. R. Williams, Utica.
N. E. Kernan, Utica.	E. J. Millsbaugh, Utica.
I. N. Maynard, Utica.	C. S. Symonds, Utica.
W. T. Baker, Utica.	J. W. McLean, Utica.
F. H. Moore, Utica.	

Executive Officers:

Frank E. Wheeler, president.
 Edward A. Carton, vice-president.
 Francis Kernan, manager.
 Fred'k H. Moore, treasurer.
 W. E. Hopkins, secretary.

International Silver Company.

Title:

International Silver Company.

Date of Organization:

November 21, 1898, under laws of New Jersey.

Capital Stock Authorized:

Preferred (rate of interest, 7 per cent., cumulative)\$9,000,000
 Common (par, \$100).....\$11,000,000

Capital Stock Issued:

Preferred\$5,111,500
 Common\$9,896,000

Bonded Indebtedness:

\$3,900,000, 6 per cent., of which \$118,000 are in the treasury.
 \$127,600, first mortgage bonds of the Holmes & Edwards Silver Company.

Dividends Declared and Dates Thereof:**ON PREFERRED.**

Dividend 1¼ per cent. on preferred, payable April 1, 1900.

ON COMMON.

None.

Financial Statement:

STATEMENT, JANUARY 1, 1900.

Assets.

Plant investment.....	\$16,140,252.97
Stock on hand, manufactured, in process and raw.....	3,657,945.82
Other investments.....	319,524.55
First mortgage bonds in treasury.....	118,000.00
Cash in banks.....	391,629.05
Accounts and notes receivable.....	1,662,911.91
Total	\$22,290,264.30

Liabilities.

Capital stock, preferred.....	\$5,111,500.00
Capital stock, common.....	9,896,000.00
First mortgage bonds.....	3,900,000.00
First mortgage bonds of the Holmes & Edwards Silver Company.....	127,600.00
Accounts and notes payable.....	1,266,145.96
Reserve fund account.....	1,600,000.00
Surplus	389,018.34

Total\$22,290,264.30

Registrar of Stock:

Continental Trust Company, 30 Broad street, New York.

Transfer Agents :

Thomas & Post, 71 Broadway, New York.

Properties and Plants Owned :

Meriden Britannia Company, Meriden, Conn.
 Roger & Bros., Waterbury, Conn.
 Barbour Silver Company, Hartford, Conn.
 Wm. Rogers Mfg. Company, Hartford, Conn.
 Manhattan Silver Plate Company, Lyons, N. Y.
 Watrous Mfg. Company, Wallingford, Conn.
 Rogers Cutlery Company, Hartford, Conn.
 Meriden Silver Plate Company, Meriden, Conn.
 Wilcox Silver Plate Company, Meriden, Conn.
 The Rogers & Hamilton Company, Waterbury, Conn.
 Norwich Cutlery Company, Norwich, Conn.
 Holmes & Edwards Silver Company, Bridgeport, Conn.
 Simpson, Hall & Miller Company, Wallingford, Conn.
 Simpson Nickel Silver Company, Wallingford, Conn.
 Standard Silver Company, Toronto.
 Middletown Plate Company, Middletown, Conn.
 Derby Silver Company, Derby, Conn.

Products :

Plated ware.
 Cutlery.
 Glass ware
 Sterling silver.

Productive Capacity :

Capacity of business: \$10,000,000 annually.

Headquarters :

Meriden, Conn.
 New York office, 71 Broadway, New York.

Executive Committee :

Samuel Dodd.	C. A. Hamilton.
G. H. Wilcox.	C. H. Tibbits.
G. C. Edwards.	S. L. Barbour.

Board of Directors :

Samuel Dodd, Meriden, Conn.
 S. L. Barbour, Hartford, Conn.
 G. M. Curtis, Meriden, Conn.
 G. C. Edwards, Bridgeport, Conn.
 C. A. Hamilton, New York.
 H. J. Lewis, Stratford, Conn.
 G. D. Munson, Wallingford, Conn.
 Edwin M. Post, New York.
 George Rockwell, Meriden, Conn.
 E. R. Thomas, New York.
 Frederick Wilcox, New York.
 G. H. Wilcox, Meriden, Conn.

Officers :

Samuel Dodd, president.
 G. H. Wilcox, first vice-president, Meriden, Conn.
 G. C. Edwards, second vice-president, Bridgeport, Conn.
 C. A. Hamilton, third vice-president, New York.
 G. M. Curtis, treasurer, Meriden, Conn.
 O. F. Thomas, auditor, Lyons, N. Y.
 G. Rockwell, secretary, Meriden, Conn.

Sales Agents or Offices at Home and Abroad :

1128 Broadway and 208 Fifth avenue, New York.
 11 Maiden Lane, New York.
 195 State street, Chicago.

International Steam Pump Company.

Title :

International Steam Pump Company.

Date of Organization :

March 9, 1899, under laws of New Jersey.

Capital Stock Authorized :

Preferred (6 per cent. cumulative).....\$12,500,000
 Common (par, \$100).....\$15,000,000

Capital Stock Issued :

Preferred \$8,850,000
 Common \$12,262,500

Bonded Indebtedness :

\$3,650,000 preferred and \$2,737,500 common in treasury to retire \$2,000,000 7 per cent. H. R. Worthington preferred stock; \$1,500,000 6 per cent. debentures, and \$500,000 8 per cent. preference shares of the Blake & Knowles Steam Pump Works, Limited.

Dividends Declared and Dates Thereof :**ON PREFERRED.**

1½ per cent., August 1, 1899.
 1½ per cent., November 1, 1899.
 1½ per cent., February 1, 1900.
 1½ per cent., May 1, 1900.
 1½ per cent., August 1, 1900.
 1½ per cent., November 1, 1900.

ON COMMON.

None.

Financial Statement :

The net profits of the company and their constituent companies for the year ending March 31, 1900 (except the Geo. F. Blake Mfg. Company and the Laidlaw-Dunn-Gordon Company, which are for eleven months ending March 31, 1900), were \$1,813,906.84, after first deducting \$168,152.94 for depreciation on plants, buildings, &c.

BALANCE SHEET, MARCH 31, 1900.**Assets.**

By real estate, buildings, plants, tools, fixtures, patents, patterns and drawings owned by the International Steam Pump Company, formerly Laidlaw - Dunn - Gordon Company, Snow Steam Pump Works, Dean Steam Pump Company, including only actual tangible assets.....	*\$2,950,098.58
By tangible net assets of Henry R. Worthington	*5,877,440.06
By net assets of the Blake Mfg. Company	*3,354,992.37
By expenditures to buildings, machinery, plant, &c.....	45,824.25
By patents owned and controlled by Henry R. Worthington and the good will of the businesses of Henry R. Worthington, Geo. F. Blake Mfg. Company and of the companies now owned by the International Steam Pump Company.....	16,009,463.40
	\$28,237,818.66

Liabilities.**To capital stock:**

Preferred shares issued and outstanding.....	\$8,850,000
Preferred shares reserved for outstanding and underlying securities..	3,650,000
	\$12,500,000.00
Common stock issued and outstanding	\$12,262,500
Common stock issued and reserved for outstanding and underlying securities	2,737,500
	15,000,000.00

To bills payable.....	425,000.00
To creditors.....	134,568.66
To sundry stockholders for quarterly preferred dividend to March, 1900..	132,750.00
To reserve to meet depreciation of buildings, machinery, tools, fixtures, patterns, drawings, &c.....	45,000.00
	<hr/>
	\$28,237,318.66

* Included in the above are net liquid assets, consisting of:

Accounts and bills receivable.....	\$2,505,443.49
Merchandise: Pumps manufactured and in process of manufacture, and raw materials.....	3,641,360.06
And cash.....	210,387.15
	<hr/>
	\$6,357,190.70

Registrar of Stock :

City Trust Company.

Transfer Agents :

Colonial Trust Company.

Properties and Plants Owned :

Henry R. Worthington of Brooklyn and Elizabethport.
Blake & Knowles Steam Pump Works, Limited.
Deane Steam Pump Works of Holyoke, Mass.
Lalldlaw-Dunn-Gordon Company of Cincinnati, Ohio.
Snow Steam Pump Works of Buffalo, N. Y.

Products :

Pumping machinery.
Condensers.
Air compressors.
Water meters.
Cooling towers.

Headquarters :

26 Broadway, New York City.

Board of Directors :

Max Nathan, New York.
Charles L. Broadbent, New York.
John W. Dunn, East Orange, N. J.
Daniel O'Day, Buffalo, N. Y.
James H. Snow, Buffalo, N. Y.
Phillip Lehman, New York.
Marcus Stine, New York.
F. M. Wheeler, Montclair, N. J.
Joseph Seep, Oil City.
John E. Borne, New York.
Harry B. Hollins, New York.
Harry E. Knapp, New York.
Arnold Tanzer, New York.
Theodore L. Herrmann, New York.
Chas. N. King, Jersey City, N. J.
Max Nathan.

Executive Officers and Managers of Plants :

John W. Dunn, president.
Marcus Stine, first vice-president.
C. L. Broadbent, second vice-president.
Max Nathan, treasurer.
James H. Snow, secretary.

Magnus Metal Company.

Title :

Magnus Metal Company.

Date of Organization :

July 18, 1899.

Capital Stock Authorized :

Preferred (par, \$100; rate of interest, 8 per cent., non-cumulative).....\$1,500,000
Common (par, \$100).....\$1,500,000

Capital Stock Issued:

Preferred\$1,000,000
Common\$1,000,000

Bonded Indebtedness :

None.

Dividends Declared and Dates Thereof :

ON PREFERRED.

No. 1, October 18, 1899, \$2 per share.
No. 2, January 17, 1900, \$2 per share.
No. 3, April 19, 1900, \$2 per share.
No. 4, January 18, 1900, \$2 per share.
No. 5, October 17, 1900, \$2 per share.

ON COMMON.

No. 1, January 17, 1900, \$10 per share.

Properties and Plants Owned :

Brady Metal Company of New York.
Buffalo Brass Company, Buffalo, N. Y.
Fort Pitt Bronze Company, Pittsburgh, Pa.

Stiles Metal Company, New Haven, Conn.
E. Blunt Mfg. Company, Newark, N. J.

Products :

Brass car and engine castings.
Journal bearings.
Metals.

Productive Capacity :

30,000,000 pounds per annum.

Improvements or Additions Under Way :

None.

Headquarters :

Buffalo, N. Y.

Board of Directors :

Charles Miller.
J. E. French.
W. H. Silverthorne.
J. B. Brady.
N. H. Haberle.
H. H. Hewitt.
M. S. Paine.

Executive Officers :

H. H. Hewitt, president.
J. E. French, vice-president.
M. S. Paine, secretary and treasurer.

Manager of Plants :

S. H. Jones, general manager.

National Enameling & Stamping Company.

Title :

National Enameling & Stamping Company.

Date of Organization :

January 21, 1899, under New Jersey laws.

Capital Stock Authorized :

Preferred (rate of interest, 7 per cent.,
cumulative)\$10,000,000
Common (par, \$100).....\$20,000,000

Capital Stock Issued :

Preferred\$7,658,600
Common\$14,038,100

Bonded Indebtedness :

Two mortgages of \$400,000 and \$200,000 respectively,
taken over at the time the St. Louis Stamping
Company and American Stamping Company's
properties were acquired.

Dividends Declared and Dates Thereof :**ON PREFERRED.**

7 per cent. per annum paid quarterly since organiza-
tion of company—viz., on the first days of April,
July, October, 1899, January, April, July and Oc-
tober 1, 1900.

ON COMMON.

None declared or paid.

Financial Statement :

Balance sheet December 31, 1899, audited by Del-
vitt, Dever, Griffiths & Co., New York:

Assets.

Real estate, buildings, machinery, plant
tools, &c., acquired from venders
and cost of new rolling mills, build-
ings and other additions and im-
provements to property.....\$19,773,470.05
Expense of organization and
incorporation of com-
pany, including revenue
stamps and State taxes..\$130,559.53
Less—
One-third charged to profit
and loss account.....\$43,519.84
87,039.69
Stocks of merchandise, material and
supplies on hand..... 3,392,490.61
Accounts and bills receivable..... 600,461.63
Payments in advance for next year's
business 29,728.71
Accrued interest on deposits..... 1,743.81
Cash at bankers' and on hand..... 273,126.16
Total\$24,158,060.66

Liabilities.

Capital stock issued:
76,586 7 per cent. pre-
ferred shares of
\$100 each.....\$7,658,600.00
140,381 common shares.. 14,038,100.00
216,967 shares\$21,696,700.00
Mortgages assumed from venders on
acquiring properties 600,000.00
Bills payable..... 650,900.00
Sundry creditors 378,584.07
Profit and loss account:
Balance to credit as per
statement\$1,322,374.08
Less dividends on 7 per
cent. preferred shares. 490,497.49
831,876.59

Total\$24,158,060.66
*Profit and Loss Account from February 1, 1899, to De-
cember 31, 1899 :*

To remuneration of executive officers,
branch managers and directors....\$79,144.87

To repairs to buildings, machinery,
plant, &c..... 156,437.50
To interest..... 33,556.01
To one-third cost of expenses organiz-
ing and incorporating company.... 43,519.84
To balance carried down..... 1,322,374.08

Total\$1,635,032.30

Registrar of Stock :

Colonial Trust Company, New York.

Transfer Agents :

New Jersey Corporations' Agency, Jersey City, N. J.

Properties and Plants Owned :

St. Louis Stamping Company, St. Louis, Mo., and
Granite City, Ill.
Kieckhefer Bros. Company, Milwaukee, Wis.
Matthal, Ingram & Co., Baltimore, Md.
Haberman Mfg. Company, New York.
American Stamping Company, Brooklyn, N. Y.
Eastern Tin Ware Company, Portland, Conn.
Stewart Enamel Company, Bellaire, Ohio.
Granite City Rolling Mills, Granite City, Ill.
St. Louis Tin Plate Company, St. Louis, Mo.

Products :

Open hearth steel.
Black plates.
Tin plate.
Sheet iron.
Enameled household goods and utensils.
Tinware, stamped and pieced.
Galvanized ware.
Japanned ware.
Sheet metal ware.
Hollow ware.
Copper ware.

Productive Capacity :

Black and tin plate, 288 tons per day.

Headquarters :

81 and 83 Fulton street, New York.

Executive Committee :

F. G. Niedringhaus, president *ex-officio*.
Fred. Haberman.
Ferd. A. W. Kieckhefer.
Wm. H. Matthal.
T. K. Niedringhaus.
Geo. W. Knapp.

Board of Directors :

F. G. Niedringhaus, St. Louis.
G. W. Niedringhaus, St. Louis.
T. K. Niedringhaus, St. Louis.
Fred. Haberman, New York.
Louis Haberman, New York.
Geo. W. Knapp, Baltimore.
Ferd. A. W. Kieckhefer, Milwaukee.
James E. Ingram, Baltimore.
W. H. Matthal, Baltimore.
Louis C. Baring, Chicago.
H. August Luedke, Milwaukee.
Chas. N. King, Jersey City.
A. M. Steinhardt, New York.

Executive Officers and Managers of Plants :

Fred. G. Niedringhaus, president.
Frederick Haberman, first vice-president.
F. A. W. Kieckhefer, second vice-president.
James E. Ingram, treasurer.
W. H. Matthal, secretary.
A. M. Steinhardt, assistant secretary and treasurer.
Geo. W. Knapp, director general of works.

Sales Agents and Offices Abroad :

Albert S. King, 8 and 9 Stonecutter street, Farringdon
street, London.

National Steel Company.

Title:

National Steel Company.

Date of Organization:

February 27, 1899, under laws of New Jersey.

Capital Stock Authorized:

Preferred (7 per cent., cumulative).....\$27,000,000
Common (par, \$100).....\$32,000,000

Capital Stock Issued:

Preferred\$27,000,000
Common\$32,000,000

Bonded Indebtedness:

\$4,434,000 bonds, assumed.

Dividends Declared and Dates Thereof:

ON PREFERRED.

1¾ per cent. on preferred stock, June 30, 1899.
1¾ per cent. on preferred stock, September 30, 1899.
1¾ per cent. on preferred stock, December 30, 1899.
1¾ per cent. on preferred stock, March 31, 1900.
1¾ per cent. on preferred stock, June 30, 1900.
1¾ per cent. on preferred stock, September 29, 1900.
1¾ per cent. on preferred stock, December 31, 1900.

Financial Statement:

GENERAL BALANCE SHEET, MARCH 20, 1900.

Plants, real estate, machinery, &c.....	\$49,375,510.30
Investments in ore, coke, coal properties, furnaces and boats.....	11,058,287.00
Inventories, at cost.....	3,170,550.29
Cash advanced on ore on docks.....	1,754,045.19
Accounts receivable.....	3,511,394.72
Cash	4,125,219.03
Total assets.....	\$72,995,006.53
Preferred stock authorized and issued (\$100 shares).....	\$27,000,000.00
Common stock authorized and issued (\$100 shares).....	32,000,000.00
Contracts due on ore property and boats:	
Due August 1, 1900.....	1,640,491.18
Due August 1, 1901.....	2,239,349.99
Purchase money mortgage assumed:	
Due 1900 and 1901.....	\$299,000
Due 1902 to 1905.....	1,428,000
Due 1906 to 1908.....	1,887,000
Due 1909 to 1912.....	598,000
Due 1913 to 1919.....	259,000—
Accounts payable.....	1,937,774.59
Surplus	3,706,390.77

Total liabilities..... \$72,995,006.53

After the annual stockholders' meeting the directors voted to charge off for improvements made during the fiscal year, amounting to \$3,617,329.04, leaving the balance sheet as shown above.

Registrar of Stock:

First National Bank, New York.

Transfer Agents:

New Jersey Registration & Trust Company, East Orange, N. J.
Guaranty Trust Company, New York.

Plants Acquired, Owned and Controlled:

Ohio Steel Company, Youngstown, Ohio.
Shenango Valley Steel Company, New Castle, Pa. (steel plant and furnaces).
King, Gilbert & Warner, Columbus, Ohio.
Bellaire Steel Company, Bellaire, Ohio.
Ætna-Standard Iron & Steel Company, Mingo Junction, Ohio (steel plant and blast furnaces).

Buhl Steel Company, Sharon, Pa.

Sharon Iron Company, Sharon, Pa. (blast furnace only).

Rosena Furnace Company, New Castle, Pa. (furnace).

Thomas Furnace Company, Niles, Ohio (furnace).

Ohio Iron Company, Zanesville, Ohio (furnace).

Columbia Iron & Steel Company, Uniontown, Pa.

Standard-Connellsville Coke Company, Pleasant Unity, Pa.

Continental Coke Company, two coking coal tracts at Uniontown, Pa.

Products:

Steel billets.
Sheet bars.
Tin plate bars.
Steel rails.
Pig iron.
Coke.
Merchant bars.
Agricultural shapes.

Productive Capacity:

1,800,000 tons steel.

Improvements or Additions Under Way:

Third furnace with two stacks at Mingo, Ohio; fourth furnace at New Castle, Pa.; third furnace at Youngstown, Ohio; billet mill at Youngstown, Ohio; 300 coke ovens at Pleasant Unity, Pa.; 600 coke ovens at Revere Tract, Uniontown, Pa.; 400 coke ovens at Thompson Tract, Uniontown, Pa.

Headquarters:

Battery Park Building, New York.

Executive Committee:

W. E. Reis.
W. H. Moore.
R. M. Gilbert.
Henry Wick.
D. G. Reid.
W. B. Leeds.
F. S. Wheeler.

Board of Directors:

W. E. Reis, New York City.
Henry Wick, New York City.
Myron C. Wick, Youngstown, Ohio.
R. M. Gilbert, New York City.
A. B. Carter, Bellaire, Ohio.
James McLain, New York City.
D. G. Reid, New York City.
Warner Arms, New York City.
W. B. Leeds, New York City.
W. T. Graham, New York City.
W. H. Moore, New York City.
J. H. Moore, Chicago.
John A. Topping, New York City.
James B. Dill, New York City.
F. S. Wheeler, New York City.

Executive Officers and Managers of Plants:

W. E. Reis, president.
Henry Wick, first vice-president and chairman of Executive Committee.
R. M. Gilbert, second vice-president.
W. H. Baldwin, secretary and auditor.
F. S. Wheeler, treasurer.
H. B. Wheeler, assistant treasurer.

Sales Agents or Offices at Home and Abroad:

Wm. H. Eaton, general foreign sales agent, 77 and 78 Greenwich street, London, England.

National Tube Company.

Title:

National Tube Company.

Date of Organization:

May, 1899, under laws of New Jersey.

Capital Stock Authorized:

Preferred (7 per cent., cumulative).....\$40,000,000
Common (par, \$100).....\$40,000,000

Capital Stock Issued:

Preferred\$40,000,000
Common\$40,000,000
Of this there is held in the treasury, for the benefit of the corporation, 37 shares preferred stock and 1396 shares of common stock.

Bonded Indebtedness:

None.

Dividends Declared and Dates Thereof:**ON PREFERRED.**

Quarterly dividend of 1½ per cent., beginning October 1, 1899, to date.

ON COMMON.

Quarterly dividend of 1½ per cent., paid August 15 and November 15, 1900, the sum of \$2,400,000 having been segregated from the earnings of the last year as a provision for distribution of 6 per cent. dividend during present fiscal year.

Financial Statement:

BALANCE SHEET, JUNE 30, 1900.
Liabilities.

Capital stock:		
Preferred	\$40,000,000.00	
Common	\$40,000,000.00	
		\$80,000,000.00
Accounts payable.....	1,158,436.43	
National Tube Works Company.....	1,496,668.74	
Reserve for depreciation.....	500,000.00	
Reserve for dividends of common stock for year ending June 30, 1900.....	2,400,000.00	
Surplus: Profits for year per profit and loss account.....	\$13,878,364.69	
Less dividends on preferred stock.....	\$2,800,000.00	
Reserve for dividends on common stock out of profits for year to date	2,400,000.00	5,200,000.00—
Total		\$94,233,469.86

Assets.

Real estate, buildings, plant, machinery and other permanent investments.....	\$72,953,937.36
Bills receivable.....	1,255,411.47
Accounts receivable.....	5,075,012.33
Merchandise, materials and supplies.....	5,801,690.74
Prepayments on ore contracts.....	768,612.47
Miscellaneous investments.....	225,078.33
U. S. Government, State, municipal and railroad bonds (cost \$2,908,119.20) at par.....	2,800,000.00
Cash	5,353,727.16
Total	\$94,233,469.86

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING JUNE 30, 1900.

Profits of the manufacturing and commercial business, including profits derived from operation of National Tube Works Company, after deducting all expenses.....	\$14,047,115.87
Dividends and interest.....	614,368.02
Total	\$14,661,483.89
Reserve for depreciation of buildings, plant and machinery.....	\$500,000.00
Reserve for possible loss in collection of outstanding accounts.....	175,000.00
Premiums on bonds purchased.....	108,119.20—
	783,119.20
Net profits for the year.....	\$13,878,364.69
Dividends on preferred stock.....	\$2,800,000.00
Reserve for dividends on common stock for the year at the rate of 6 per cent. per annum.....	2,400,000.00
	5,200,000.00
Surplus after providing for dividends per balance sheet.....	\$8,678,364.69

Registrar of Stock:

Colonial Trust Company of New York.

Transfer Agents:

The company have their own transfer department, at 26 Cortlandt street, New York.

Properties and Plants Owned:

Plant.	Location.	Acres of ground.
National Tube Works, comprising— National Pipe Department, Boston Iron & Steel Works, National Rolling Mills, Monongahela Furnaces, Monongahela Steel Works, Republic Iron Works, U. S. Seamless Tube Works, McKeesport Connecting R. R., National Transportation Company.	Pittsburgh, Pa.	90
Cohoes Tube Works—Bedstead pipe and other tubular specialties.....	Cohoes, N. Y.	1½
National Galvanizing Works—Galvanizing, kalamelizing, tinning and other anti-corrosive treatments.....	Versailles, Pa.	10¼
Syracuse Tube Company—Special high-grade locomotive and marine boiler tubes	Syracuse, N. Y.	3
Pennsylvania Tube Works—Lap and butt-weld pipe works, manufacturing gas, water and oil-line pipe and other tubular specialties, in sizes ½ inch to 28 inches inclusive, both black and galvanized	Pittsburgh, Pa.	15
Ohio Tube Company—Pipe plant for black and galvanized merchant pipe..	Warren, Ohio.	30.92
Allison Mfg. Company's Boiler Tube Works	Philadelphia, Pa.	4¼
Morris, Tasker & Co., and Delaware Iron Works—Electric light, telephone and telegraph conduits, poles and other tubular specialties.....	New Castle, Del.	66
Chester Pipe & Tube Company's oil well tubing, casing and line pipe works, and lease of Tidewater Rolling Mill..	Chester, Pa.	15.4
Oil City Tube Work's oil well tubing, casing, line and merchant, black and galvanized pipe plant.....	Oil City, Pa.	10.2
American Tube & Iron Company's lap weld pipe and tube plant for regular and special long lengths.....	Youngstown, Ohio	10.94
American Tube & Iron Company's pipe, tube and galvanizing plant.....	Middletown, Pa.	12.23
Oil Well Supply Company's Elba Iron Works—Rolling mills.		
Oil Well Supply Company's Continental Tube Works.....	Pittsburgh,	
Riverside Iron Works, bar and guide mills—Blast furnaces, steel works, skelp mills, galvanizing works, nail factories, tube works, coke plant and coal properties. The coal properties owned are located as follows: Steubenville, Ohio, 77 acres; Wheeling, W. Va., 200 acres; Benwood, W. Va., 328 acres; Fayette County, Pa., 996 acres. Benwood, W. Va. This latter tract is a part of the Con-		68
nellsville coking coal. Total, 1601	Steubenville, Ohio.	
Pittsburgh Tube Works pipe plant.....	Pittsburgh, Pa.	4

Products:

Pig iron.
Bessemer steel billets.
Merchant pipe, black and galvanized, ¼ to 36 inches.
Casing tubing and drive pipe for well purposes.
Boiler tubes.
Seamless tubes.
Trolley and electric light poles.
Steel bottles.
Shrapnel.
Projectiles.
Lap welded and seamless cylinders.
Forgings.

Improvements or Additions Under Way:

One 500-ton daily capacity blast furnace to be added to the plant of the Riverside Iron Works, at Benwood, W. Va.

Headquarters:

Executive and financial departments, 26 Cortlandt street, New York.

Manufacturing and sales departments, Conestoga Building, Pittsburgh.

Board of Directors:

Henry Aird, Troy, N. Y.
Robert Bacon, New York City.
E. C. Converse, New York City.
Wm. Nelson Cromwell, New York City.
John D. Culbertson, Wheeling, W. Va.
William J. Curtis, Summit, N. J.
John Don, Troy, N. Y.
John Eaton, Pittsburgh, Pa.
Wm. S. Eaton, Boston, Mass.
William P. Hamilton, New York City.
F. J. Hearne, Pittsburgh, Pa.
J. R. De Lamar.
William H. Latshaw, Pittsburgh, Pa.
Arthur F. Luke, New York City.
A. S. Matheson, New York City.
Daniel O'Day, New York City.
Francis L. Potts, Philadelphia, Pa.
Joshua Rhodes, Pittsburgh, Pa.
William B. Rhodes, Pittsburgh, Pa.
William B. Schiller, Pittsburgh, Pa.
Charles Steele, New York City.
F. R. Tobey, Philadelphia, Pa.
J. N. Vance, Wheeling, W. Va.

Executive Officers and Managers of Plants:

Edmund C. Converse, president.
Joshua Rhodes, chairman of the board.
F. J. Hearne, first vice-president.
Francis L. Potts, second vice-president.
Wm. H. Latshaw, third vice-president.
A. S. Matheson, general manager.
A. F. Luke, treasurer, New York.
E. H. Osborne, secretary, New York.
Sullivan & Cromwell, general counsel.

Sales Agents or Offices at Home and Abroad:

Edward Worcester, general sales agent, Conestoga Building, Pittsburgh.

Geo. S. Garritt, assistant general sales agent, Conestoga Building, Pittsburgh.

New York Territory:

Headquarters, Havemeyer Building, New York City; sales agent, Clifton Wharton, Jr. Territory: All of New England, New York, New Jersey (except Camden, N. J.), California, Nevada. Boston office, 95 Milk street, Boston; C. F. Velasco, local sales agent.

Philadelphia Territory:

Headquarters, 267 South Fourth street, Philadelphia; sales agent, H. Cheston Vansant. Pennsylvania east of Altoona (including Altoona), Delaware, Maryland, east of Cumberland, but not including Cumberland, Virginia, North and South Carolina, Georgia, Florida and Alabama.

Pittsburgh Territory:

Headquarters, Fidelity Building, Pittsburgh; sales agent, A. M. Lally. Pennsylvania west of Altoona but not including Altoona, Maryland, Cumberland and west thereof, West Virginia, Ohio, Indiana, Michigan and Kentucky east of Louisville (excluding Louisville).

Chicago Territory:

Headquarters, Western Union Building, Chicago; sales agent, H. S. Raymond. Illinois north of parallel 40, Wisconsin, Minnesota, Iowa, Nebraska, North and South Dakota, Montana, Wyoming, Colorado, Utah, Idaho, Oregon and Washington.

Foreign:

Headquarters, Havemeyer Building, New York. All export business.

London office, Dock House, Billiter street, E. C.

Purchasing Agent:

C. J. O'Connor, general purchasing agent, Conestoga Building, Pittsburgh, Pa.

New Haven Iron & Steel Company.

Title:

New Haven Iron & Steel Company.

Date of Organization:

July 28, 1899, under the laws of New Jersey.

Capital Stock Authorized:

\$500,000.00; stock all of one kind—100,000 shares of \$5 each.

Capital Stock Issued:

\$500,000.00.

Bonded Indebtedness:

None.

Dividends Paid and Dates Thereof:

November 1, 1899, 30 cents per share.
December 30, 1899, 20 cents per share.
April 16, 1900, 15 cents per share.
July 16, 1900, 15 cents per share.
October 15, 1900, 15 cents per share.

Financial Statement:**REPORT OF THE TREASURER.**

Gross sales, August 1, 1899, to August 31, 1900.....	\$833,019.73
Finished iron on hand August 31, 1900.....	16,800.00
	<hr/> \$849,819.73

Materials used August 1, 1899,

to August 31, 1900.....\$398,711.67

Finished iron on hand August 1, 1899.....

10,000.00 \$408,711.67

Gross profit \$441,108.06

General and operating expenses, August 1, 1899, to August 31, 1900..... 283,281.24

Net profit \$157,826.82

Revenue from interest and dividends \$584.24

Unearned premiums and taxes 1,500 2,048.24

Total net profits.....\$159,875.06

Dividends paid 80,000.00

Surplus August 31, 1900..... \$79,875.06

Assets.

	Aug. 1, 1899.	Aug. 31, 1900.
Plant	\$330,000.00	\$331,868.56
Materials on hand.....	70,000.00	41,937.50
Cash, Philadelphia and New Haven	92,101.00	117,328.40

Organization and Charter....	7,899.00	8,969.00
Accounts receivable.....		61,023.42
Bills receivable.....		15,663.19
Unearned premiums and taxes.....		1,500.00
Stocks and bonds.....		7,987.50

Totals\$500,000.00 \$586,277.57

Liabilities.

Capital Stock	\$500,000.00	\$500,000.00
Accounts payable		6,402.51
Surplus		79,875.06

Totals\$500,000.00 \$586,277.57

Net assets, August 31, 1900.....\$586,277.57

Net assets, August 1, 1899..... 500,000.00

Increase, August 1, 1899, to August 31,
1900 \$86,277.57

Registrar of Stock :

Girard Trust Company of Philadelphia, Pa.

Transfer Agents :

New Jersey Corporation Guarantee & Trust Com-
pany, Camden, N. J.

Properties and Plants Owned :

Property and plant formerly owned and operated by
the New Haven Rolling Mill Company, New Ha-
ven, Conn.

Products :

Merchant, bar and band iron and steel, small sizes
for nut, bolt and carriage work.

Productive Capacity :

20,000 tons of bar iron and steel per year.

Headquarters :

Land Title Building, Philadelphia, Pa.

Executive Committee :

Chas. A. Porter, Philadelphia, Pa.
Kennedy Crossan, Philadelphia, Pa.
L. S. Filbert, Philadelphia, Pa.

Board of Directors :

C. C. Kauffman, Columbia, Pa.
Kennedy Crossan, Philadelphia, Pa.
Chas. A. Porter, Philadelphia, Pa.
L. S. Filbert, Philadelphia, Pa.
A. Loudon Snowden, Philadelphia, Pa.
John B. Peddle, Woodbury, N. J.
George D. Watrous, New Haven, Conn.

Executive Officers and Managers of Plants :

C. C. Kauffman, president.
A. Loudon Snowden, vice-president.
Clarence Kennedy Crossan, secretary and treasurer.
J. E. Schall, general manager.

Niles-Bement-Pond Company.

Title :

Niles-Bement-Pond Company.

Date of Organization :

August 15, 1899.

Capital Stock Authorized :

Preferred (rate of interest, 6 per cent.,
cumulative)\$3,000,000
Common (par, \$100).....\$5,000,000

Capital Stock Issued :

Preferred, \$2,000,000 (redeemable at 105 in 1911).
(\$1,000,000 preferred held in the treasury to re-
tire an equal amount of Niles Tool Works pre-
ferred).
Common, \$5,000,000.

Bonded Indebtedness :

None.

Dividends Declared and Dates Thereof :

ON PREFERRED.

Dividends of 1½ per cent. on preferred declared No-
vember 15, 1899; February 6, 1900; May 8, 1900;
August 7, 1900, and November 13, 1900.

ON COMMON.

3 per cent. declared August 7, 1900; 1½ per cent. De-
cember 20, 1900.

Financial Statement :

Net earnings for the first year, to June
30, 1900\$1,116,361.32

Registrar of Stock :

Colonial Trust Company, New York.

Transfer Agents :

Corporation Trust Company, New Jersey.

Properties and Plants Owned :

Niles Tool Works Company, Hamilton, Ohio.
Bement, Miles & Co., Philadelphia.
Pond Machine Tool Company, Plainfield, N. J.
Crane Shop, Mifflin street, Philadelphia.

Products :

Machine tools.
Iron and steel working machinery.
Steam hammers.
Hydraulic machinery.
Electric traveling cranes.
Machinery for railroad shops.

Productive Capacity :

Employ 3500 men.

Improvements or Additions Under Way :

Erecting shop for crane work, 50 x 300 feet, at Phila-
delphia.

Headquarters :

136 and 138 Liberty street, New York City.

Board of Directors :

Alexander Gordon, chairman.
Clarence S. Bement, Philadelphia.
Thomas T. Gaff, Cincinnati, Ohio.
W. S. McKinney, Pittsburgh, Pa.
A. C. Stebbins, Plainfield, N. J.
Frederick B. Miles, Philadelphia.
Gordon Shillito, Cincinnati, Ohio.
Daniel W. Holmes, Cincinnati, Ohio.
Fred. W. Gordon, Philadelphia.
Edwin M. C. Davis, New York.
James K. Cullen, Hamilton, Ohio.
Charles A. Moore, New York.
E. C. Burke, Cleveland, Ohio.
Walter L. Clark, New York.
Robert C. McKinney, New York.

Executive Officers and Managers of Plants :

Robert C. McKinney, president.
James K. Cullen, }
Fred. B. Miles, } vice-presidents.
A. C. Stebbins, }
Walter L. Clark, }
Charles L. Cornell, treasurer.
E. M. C. Davis, secretary.

Engineers :

Frederick B. Miles.
George T. Reiss.
A. C. Stebbins.

Sales Agents or Offices at Home and Abroad :

Chicago, Western Union Building.
Pittsburgh, 918 Carnegie Building.
Boston, 65-67 Oliver street.
Philadelphia, Callowhill and Twenty-first streets.
Hamilton, Ohio.
Plainfield, N. J.
St. Louis, 615 North Fourth street.
London, England, 25 Victoria street.

Pressed Steel Car Company.

Title :

Pressed Steel Car Company.

Date of Organization :

January 12, 1899, under laws of New Jersey.

Capital Stock Authorized :

Preferred (rate of interest, 7 per cent., non-cumulative) (par, \$100).....\$12,500,000
Common (par, \$100).....\$12,500,000

Capital Stock Issued :

Preferred\$12,500,000
Common\$12,500,000

Bonded Indebtedness :

None.

Dividends Declared and Dates Thereof :

Preferred: Four quarterly dividends of 1½ per cent. declared on preferred stock during 1899, and four quarterly dividends of 1½ per cent. declared during the year 1900.

Common: 6 per cent declared on common out of earnings of 1899, paid in quarterly installments during the year 1900.

Financial Statement :

The operations of the Pressed Steel Car Company for the year 1899 are summarized as follows: The total output was 9,624 cars, 127,656 bolsters and 50,926 truck frames, besides other miscellaneous parts. The orders on hand January 1 to be executed during 1900 amount to \$16,596,863. These are to be completed by June 1. The earnings, &c., for the year were:

Gross earnings.....\$13,889,252.28
Operating expenses..... 11,652,148.43

Net earnings..... \$2,237,103.85

Deduct dividend of 7 per cent. on
\$12,500,000 preferred stock..... 875,000.00

Balance, equal to 11 per cent. on
\$12,500,000 common stock.... \$1,362,103.85

Dividend of 6 per cent. on \$12,500,000 common..... 750,000.00

Surplus for working capital.... \$612,000.00

Registrar of Stock :

Central Trust Company, New York; Fidelity Title & Trust Company, Pittsburgh, Pa.

Transfer Agents :

Guaranty Trust Company, New York; Mercantile Trust Company, Pittsburgh, Pa.

Properties and Plants Owned :

Schoen Pressed Steel Company, Pittsburgh, Pa.
Fox Pressed Steel Equipment Company, Joliet, Ill.

Plants :

Wood's Run Plant, Allegheny, Pa.
McCandless avenue, Pittsburgh, Pa.
Joliet Plant, Joliet, Ill.
McKee's Rocks Plant, McKee's Rocks, Pa.

Products :

Steel cars.
Steel specialties for wooden cars, such as truck frames, bolsters, stake pockets, stakes, corner bands, center plates, &c.

Productive Capacity :**Annual Capacity :**

Cars, 35,000.
Truck frames, 120,000.
Bolsters, 250,000.

Improvements or Additions Under Way :

None.

Headquarters :

Pittsburgh, Pa.

Executive Committee :

F. N. Hoffstot, Pittsburgh, Pa.
W. H. Schoen, Pittsburgh, Pa.
E. A. Schoen, Pittsburgh, Pa.

Board of Directors :

C. T. Schoen, New York.
W. H. Schoen, Pittsburgh, Pa.
E. A. Schoen, Pittsburgh, Pa.
F. N. Hoffstot, Pittsburgh, Pa.
H. W. Oliver, Pittsburgh, Pa.
E. Hawley, New York.
A. M. Larkin, Jersey City, N. J.

Executive Officers :

C. T. Schoen, president, Pittsburgh, Pa.
W. H. Schoen, first vice-president, Pittsburgh, Pa.
E. A. Schoen, second vice-president, Pittsburgh, Pa.
W. O. Jacquette, comptroller, New York.
A. R. Fraser, treasurer, Pittsburgh, Pa.
H. J. Gearhart, auditor, Pittsburgh, Pa.
W. C. Dearmond, secretary, Philadelphia, Pa.

Manager of Plants :

E. A. Schoen, Pittsburgh, Pa.

Sales Agents or Offices at Home and Abroad :

J. B. Brady, New York.
G. E. Macklin, New York.
J. T. Milner, Chicago, Ill.
F. H. Rapley, London.

Purchasing Agent :

F. F. Anderson, Pittsburgh, Pa.

The Pittsburgh Stove & Range Company.

Title

The Pittsburgh Stove & Range Company.

Date of Organization :

September 1, 1899.

Capital Stock Authorized :

Preferred (7 per cent., cumulative).....\$1,000,000
Common (par, \$50).....\$1,000,000

Capital Stock Issued :

Preferred\$1,000,000
Common\$1,000,000

Bonded Indebtedness :

None.

Dividends Declared and Dates Thereof :**ON PREFERRED.**

1½ per cent. on preferred stock, paid December 28, 1899.

Have paid 7 per cent. first year, and declared 5 per cent. on December 1.

ON COMMON.

None.

Registrar of Stock :

Fidelity Title & Trust Company.

Transfer Agents :

Union Trust Company.

Properties and Plants Owned :

De Haven & Co., Pittsburgh, Pa.
 Anschutz-Bradberry Company, Allegheny, Pa.
 Walters Stove Company, Sharpsburg, Pa.
 Crea, Graham & Co., Allegheny, Pa.
 Bissell & Co., Pittsburgh, Pa.
 A. Bradley & Co., Pittsburgh, Pa.
 Baldwin & Graham, New Castle, Pa.
 F. L. Voegtley & Co., Allegheny, Pa.
 The Graff Company, Monongahela City, Pa.

The above plants, all now owned by the Pittsburgh Stove & Range Company, were taken into the consolidation. We have closed up three of these plants and took their trade-marks from them. The other six plants we are now running under their individual trade-marks. We are also adding to each of these trade-marks a full, new line of gas ranges, steel ranges, cast ranges and cook stoves.

Products :

Stoves, ranges and furnaces.
 Steel ranges, gas ranges, &c.

Productive Capacity :

75,000 to 80,000 stoves and ranges annually.

Improvements or Additions Under Way :

We are closing down some of our plants and increasing the better plants of our company. In doing this we do away with fixed charges and everything of this kind. We have built on the Crea, Graham & Co. grounds a fine steel range plant, possibly as fine as there is in the country, and a gas range plant, and are turning out of these plants goods as perfect as they can be made.

Headquarters :

909 and 911 Liberty avenue, Pittsburgh, Pa.

Executive Committee :

Chas. H. Bradley.
 J. D. Nicholson.
 J. F. MacKee.
 J. S. Graham.

Board of Directors :

Chas. H. Bradley.	L. W. De Haven.
J. D. Nicholson.	John S. Graham.
A. M. Neepner.	G. W. J. Bissell.
J. F. MacKee.	

Executive Officers :

Charles H. Bradley, president.
 J. D. Nicholson, vice-president.
 John A. Roe, general manager.
 John S. Graham, treasurer and secretary.

Managers of Plants :

S. R. Baldwin, Baldwin & Graham plant, New Castle, Pa.
 J. D. Graff, Graff & Co., Monongahela City.
 W. H. Collingwood, Anschutz-Bradberry Company, Allegheny.
 I. P. Kress, De Haven & Co., Allegheny.
 Wm. H. Collingwood, Bissell & Co., Allegheny.
 Chas. A. Walters, Walters Stove Company, Sharpsburg, Pa.

Sales Agents or Offices at Home and Abroad :

Chas. W. Goodnough, sales manager.

Purchasing Agent :

H. M. Baldwin.

Pittsburgh Valve, Foundry & Construction Company

Title :

Pittsburgh Valve, Foundry & Construction Company.

Date of Organization :

June, 1900, under laws of Pennsylvania.

Capital Stock Authorized :

Preferred (7 per cent. cumulative).....	\$2,000,000
Common	\$2,000,000

Properties and Plants Owned :

Atwood & McCaffrey, Pittsburgh.
 Pittsburgh Valve & Machine Company, Limited.
 Pittsburgh.
 Shook-Anderson Mfg. Company, Pittsburgh.
 A. Speer & Sons (Foundry), Pittsburgh.

Wilson-Snyder Mfg. Company (Pipe Fitting Department), Pittsburgh.

Business :

Engineers.
 Founders.
 Pipe fitters.
 Machinists.

Headquarters :

Empire Building, Pittsburgh, Pa.

Executive Officers and Managers of Plants :

Henry M. Atwood, president.
 J. T. Speer, vice-president.
 C. A. Anderson, treasurer.
 Moses Atwood, secretary and sales agent.
 G. E. Klingelhofer, general manager.

Republic Iron & Steel Company.

Title :

Republic Iron & Steel Company.

Date of Organization :

May 3, 1890, under laws of New Jersey.

Capital Stock Authorized :

Preferred (rate of interest, 7 per cent., cumulative)	\$25,000,000
Common (par, \$100)	\$30,000,000

Capital Stock Issued :

Preferred (in treasury, \$545,100)	\$20,852,000
Common (in treasury, \$161,000)	\$27,352,000

Bonded Indebtedness :

None.

Dividends Declared and Dates Thereof :

ON PREFERRED,
 1½ per cent. on preferred, paid October 1, 1899.
 1½ per cent. on preferred, paid January 2, 1900.
 1½ per cent. on preferred, paid April 2, 1900.
 1½ per cent. on preferred, paid July 2, 1900.
 1½ per cent. on preferred, paid October 1, 1900.
 1½ per cent. on preferred, paid January 2, 1901.

ON COMMON.

None.

Financial Statement :**PROFIT AND LOSS ACCOUNT.**

For the Fiscal Period Ending June 30, 1900.

Profits from the business of the company after deducting all expenses, excepting repairs, renewals and possible loss in collection of outstanding accounts and bills receivable....	\$5,684,100.87	
Less amount expended for improvements, renewals and repairs and deductions for depreciation of plants	\$893,013.89	
Amount deducted from ledger values for depreciation in raw and finished material on hand.	1,097,358.06	
Reserve for possible loss in collection of outstanding accounts and bills receivable	50,000.00	2,040,371.95
Net profits for the 14 months.....	\$3,643,728.92	
Dividends on preferred stock declared during first fiscal period.....	1,421,679.00	
Net surplus after providing for dividends on preferred stock....	\$2,222,049.92	

Registrar of Stock :

Chase National Bank, New York.

Transfer Agents :

City Trust Company of New York.

Properties and Plants Owned or Controlled :**Ore Properties :**

Cambria Mine (Marquette Range), Negaunee, Mich.
 Lillie Mine (Marquette Range), Negaunee, Mich.
 Franklin Mine (Missabe Range), Virginia, Minn.
 Bessemer Mine (Missabe Range), Virginia, Minn.
 Victoria Mine (Missabe Range), Virginia, Minn.
 Mahoning Ore & Steel Company [three-fiftieths interest] (Missabe Range), Hibbing, Minn.
 Union Ore Company [one-half interest] (Missabe Range), Virginia, Minn.
 Raimund Mine (on Pioneer property), near Birmingham, Ala.
 Spaulding Mine (on Pioneer property), near Birmingham, Ala.
 Gothite Mine (on Pioneer property), near Birmingham, Ala.

Coke Properties :

Connellsville Coke Works, Nicholson, Pa.
 Pioneer Coke Ovens, Thomas, Ala.

Coal Properties :

Springfield Mine, Springfield, Ill.
 Sayreton Mine (on Pioneer property), near Birmingham, Ala.
 Warner Mine (on Pioneer property), near Birmingham, Ala.
 Woodside Mine (Connellsville District), Nicholson, Pa.

Limestone Properties :

Croton Limestone Works, New Castle, Pa.
 Dale Limestone Works (on Pioneer property), near Birmingham, Ala.
 Union Limestone Works (one-sixth interest), Lowellville, Ohio.

Blast Furnaces :

Pioneer No. 1, Thomas, Ala.
 Pioneer No. 2, Thomas, Ala.
 Pioneer No. 3 (being constructed), Thomas, Ala.
 Atlantic, New Castle, Pa.
 Hannah, Youngstown, Ohio.
 Haselton, Youngstown, Ohio.
 Hall, Sharon, Pa.

Steel Plants :

Bessemer Steel Plant, Youngstown, Ohio.

Minnesota Open Hearth Steel Plant, Columbia Heights, Minn.

Birmingham Open Hearth Steel Plant, Birmingham, Ala.

Railroads and Docks :

Sharon Connecting Railroad, Sharon, Pa.
 Madison County Belt Railroad, Alexandria, Ind.
 Mahoning & Shenango Dock (two-ninths interest), Ashtabula, Ohio.

Rolling Mills :

Alexandria Works, Alexandria, Ind.
 Alabama Works, Birmingham, Ala.
 Andrews Works, Youngstown, Ohio.
 Atlantic Iron & Steel Works, New Castle, Pa.
 Birmingham Rolling Mill Works, Birmingham, Ala.
 Brown-Bonnell Works, Youngstown, Ohio.
 Central Works, Brazil, Ind.
 Corns Works, Massillon, Ohio.
 Cleveland Works, Cleveland, Ohio.
 Eagle Works, Ironton, Ohio.
 Indiana Works, Muncie, Ind.
 Inland Works, East Chicago, Ind.
 Leetonia Works, Leetonia, Ohio.
 Mahoning Valley Works, Youngstown, Ohio.
 Marion Works, Marion, Ind.
 Minnesota Works, Columbia Heights, Minn.
 Muncie Works, Muncie, Ind.
 Mitchell-Tranter Works, Covington, Ky.
 New Albany Works, New Albany, Ind.
 Sharon Works, Sharon, Pa.
 Sylvan Works, Moline, Ill.
 Springfield Works, Springfield, Ill.
 Toledo Works, Toledo, Ohio.
 Tudor Works, East St. Louis, Ill.
 Terre Haute Works, Terre Haute, Ind.
 Wabash Works, Terre Haute, Ind.
 Westerman Works, Marion, Ind.
 Wetherald Works, Frankton, Ind.

Products :

Iron ore.
 Coal.
 Coke.
 Pig iron.
 Bar iron.
 Bar steel.
 Plates.
 Angles.
 Turnbuckles.
 Light rails.
 Sheets, black and galvanized.
 Bolts and nuts.
 Spikes.
 Cold rolled steel.
 Cut nails.
 Steel fence posts.
 Steel whiffletrees.
 Agricultural shapes.
 Steel billets and slabs.

Productive Capacity :

1,000,000 tons bar iron and steel and shapes, including plates and sheets, spikes, bolts, &c.
 500,000 tons pig iron.
 200,000 tons steel billets. (Capacity will be doubled on completion of new billet mill at Youngstown.)

Improvements or Additions Under Way :

Erecting billet mill at new Bessemer steel plant, Youngstown, Ohio.
 Building additional blast furnace at Birmingham, Ala.

Headquarters :

Chicago Stock Exchange Building, Chicago, Ill.

Executive Committee :

Randolph S. Warner.
 John F. Taylor.
 Alexis W. Thompson.

George D. Wick.
T. A. Meysenburg.
G. Watson French.
Harry Rubens.
W. E. Taylor.
W. H. Hassinger.

Board of Directors :

To serve three years :

Randolph S. Warner.
T. A. Meysenburg.
John F. Taylor.
G. Watson French.
Alexis W. Thompson.
Harry Rubens.

To serve two years :

August Belmont.
Grant B. Schley.
George R. Sheldon.
Geo. D. Wick.
W. E. Taylor.
W. H. Hassinger.

To serve one year :

Myron C. Wick.
Jas. C. Corns.
L. E. Cochran.
George M. Bard.
Peter L. Kimberly.
Archibald W. Houston.

Officers :

Randolph S. Warner, president, Chicago, Ill.
G. Watson French, vice-president, Chicago, Ill.

A. W. Thompson, vice-president, Chicago, Ill.
J. F. Taylor, vice-president and treasurer, Chicago, Ill.
Wm. E. Taylor, vice-president and general manager, Chicago, Ill.
Wm. Barret Ridgely, secretary, Chicago, Ill.
Harry Rubens, general counsel, Chicago, Ill.
Geo. M. Bard, general superintendent, Chicago, Ill.
Y. B. Haagsma, general auditor, Chicago, Ill.
H. R. Moore, traffic manager, Chicago, Ill.

Sales Agents :

Geo. A. Baird, general sales agent, Chicago, Ill.
E. W. Parker, sales agent, Manhattan Building, New York.
R. S. Henderson, sales agent, Western Reserve Building, Cleveland.
Geo. M. Kenyon, sales agent, Endicott Arcade, St. Paul.
B. S. Adams, sales agent, Mermod Jaccard Building, St. Louis.
W. S. Johnston, sales agent, Ellicott square, Buffalo, N. Y.
A. W. Houston, 201-203 Elm street, Cincinnati, Ohio.
E. M. Miller, Atlas Block, Salt Lake City.
C. A. Maydwell, 308 Market street, San Francisco.
D. M. Forker, Birmingham, Ala.
Fred. J. Rowlands, Butte, Mont.
A. V. Boswell, Joplin, Mo.

Purchasing Agents :

W. L. Lee, acting purchasing agent, Chicago.
D. W. Singleton, assistant purchasing agent, Chicago.

Shelby Steel Tube Company.

Title :

Shelby Steel Tube Company.

Date of Organization :

February 9, 1900, under laws of New Jersey.

Bonded Indebtedness :

None.

Capital Stock Authorized :

Preferred (7 per cent. cumulative).....\$6,000,000
Common (par, \$100).....\$9,000,000

Capital Stock Issued :

Preferred\$5,000,000
Common\$8,175,000

Dividends Declared :

ON PREFERRED.

1½ per cent. quarterly, the last declared in November.

ON COMMON.

None.

Properties and Plants Owned :

Shelby Works, Factory "A," formerly Shelby Steel Tube Company of Ohio.
Ellwood City Works, Factory "B," formerly Ellwood Weldless Tube Company of Pennsylvania.
Greenville Works, Factory "C," formerly Greenville Tube Company of Pennsylvania.
Toledo Works, Factory "D," formerly American Weldless Steel Tube Company of Ohio.
New Castle Works, Factory "G," formerly New Castle Tube Company of Pennsylvania.
Hartford Works, Factory "M," formerly the Pope Tube Company of Connecticut.
Albany Works, Factory "N," formerly Albany Mfg. Company of Indiana.
Auburn Works, Factory "O," formerly Auburn Bolt & Nut Works of Pennsylvania.

Products :

Seamless tubing.

Productive Capacity :

100,000,000 feet per annum.

Headquarters :

American Trust Building, Cleveland, Ohio.

Directors :

W. E. Miller, Cleveland, Ohio.
— Albert A. Pope, Boston, Mass.
R. L. Coleman, Chicago, Ill.
H. A. Lozier, Cleveland, Ohio.
B. J. Williams, Shelby, Ohio.
C. T. Boynton, Chicago.
L. S. Hoyt, New Castle, Pa.
John L. McKinney, Titusville, Pa.
F. J. Carolan, San Francisco, Cal.
Frank O. Lowden, Chicago, Ill.
— James B. Dill, East Orange, N. J.

Executive Officers :

C. T. Boynton, president.
W. S. Miller, assistant to the president and treasurer.
H. H. Cockley, secretary.
L. B. Thornburgh, general sales agent.
H. S. White, assistant general sales agent.
A. C. Morse, general superintendent.

Offices and Warehouses at Home and Abroad :

Western: 135 Lake street, Chicago.
Eastern: 144 Chambers street, New York.
European: 29 Constitution Hill, Birmingham, England.

Purchasing Agent :

J. A. Pannabaker.

Sloss-Sheffield Steel & Iron Company.

Title:

Sloss-Sheffield Iron & Steel Company.

Date of Organization:

August 16, 1899.

Capital Stock Authorized:

Preferred (rate of interest, 7 per cent., non-cumulative)\$10,000,000
Common (par, \$100).....\$10,000,000

Capital Stock Issued:

Preferred\$6,700,000
Common\$7,500,000

Bonded Indebtedness:

\$2,000,000, 6 per cent., Sloss Iron & Steel Company, due February 1, 1920.
\$1,835,000, 4½ per cent., Sloss Iron & Steel Company, due April 1, 1918.

Dividends Declared and Dates Thereof:

ON PREFERRED.

Dividend dates on preferred, March 10, June 10, September 10 and December 10.

ON COMMON.

None.

Financial Statement:

The combined statement of the Sloss-Sheffield Steel & Iron Company and the Sloss Iron & Steel Company for the period ending February 1, 1900:

Resources.

Property account.....	\$16,427,914.95
Treasury securities.....	168,972.00
Stocks and bonds of other companies.....	50,829.50
Supplies, raw and finished material, at cost of production.....	194,715.49
Merchandise in company's stores....	121,467.15
Insurance, unexpired.....	14,517.08
Cash in banks.....	1,067,844.79
Bills receivable.....	58,785.76
Accounts receivable.....	754,519.91
Interest of Sloss Company's bonds accrued, but not yet due.....	33,762.50
	<hr/> \$18,893,329.13

Liabilities.

Capital stock, preferred....\$6,700,000	
Capital stock, common.....7,500,000	\$14,200,000.00
Sloss Iron & Steel Company first mortgage 6 per cent. bonds.....	2,000,000.00
Sloss Iron & Steel Company general mortgage 4½ per cent. bonds.....	2,000,000.00
Profit and loss (for two months).....	238,337.03
Extraordinary repair and renewal fund	87,372.99
Bills payable (since paid).....	66,167.98
Sundry creditors (current business)...	301,451.13
	<hr/> \$18,893,329.13

Registrar of Stock:

Guarantee Trust Company, New York.

Transfer Agents:

Central Trust Company, New York.

Properties and Plants Owned:*Sloss Iron & Steel Company:*

49,970 shares out of 50,000 shares of Sloss Iron & Steel Company, Birmingham, Ala., owning four blast furnaces, two at Birmingham and two at North Birmingham; 30,000 acres ore lands, 21,464 acres coal lands and 841 acres other lands; 1000 coke ovens at City Furnaces, Coalburg, Brookside and Blossburg, Ala., coal mines with a daily capacity of 5000 tons, and four coal washers. Two stopes at Sloss, on Red Mountain vein, with 1500 tons daily capacity, soft ore mines at Bald Eagle and Ruffner, Ala., with 200 tons daily capacity, and brown ore mines with

200 tons daily capacity. Also one-half interest jointly with Tennessee Coal Iron & Railroad Company in Champion mines, Blount County, Ala., with 400 tons capacity.

Lady Ensley Furnace Company:

Two-thirds of stock of company owning the Lady Ensley Furnace, Sheffield, Ala.

Philadelphia Furnace, Florence, Ala., one blast furnace.

Hattie Ensley Furnace, one furnace at Sheffield, Ala., and 21,500 acres of coal lands in Jefferson and Walker counties, the stock of the American Coal Mines, 3500 acres, with two mines, capacity 600 tons daily, 1800 acres brown ore lands at Russellville, and the Yutrie brown ore mines at Russellville, with two ore washers, having a capacity of 200 tons per day.

Lady Ensley Coal, Iron & Railroad Company:

The Sloss-Sheffield Company own the entire stock and all the rights, title and interest of the late Enoch Ensley to \$1,500,000, 6 per cent. purchase mines bonds, and to \$170,000 out of \$500,000 5 per cent. bonds. The Lady Ensley Company own 15,982 acres of ore lands in Colbert and Franklin counties, Ala., with three ore mines at Russellville, 16,458 acres of coal lands, with the Ivy Leaf and Mugellan mines and 200 coke ovens.

Russellville Ore Company:

All the 2520 shares, the company operating two ore washers at Russellville, with a daily capacity of 500 tons.

Hamilton Creek Ore Company:

All the 500 shares of company, owning limestone quarry and brown ore lands.

Alder Brown Ore Property in Franklin County:

Limestone quarries at North Birmingham.

Headquarters:

Birmingham, Ala.

Executive Committee:

W. G. Oakman, chairman.
J. C. Maben.
R. B. Van Cortlandt.
Joseph Bryan.
E. O. Hopkins.

Board of Directors:

Archer Brown, New York.
Joseph Bryan, Richmond, Va.
W. H. Goadby, New York.
A. H. Larkin, New York.
J. C. Maben, New York.
Richard Mortimer, New York.
W. G. Oakman, New York.
George Parsons, New York.
E. O. Hopkins, Birmingham, Ala.
E. W. Rucker, Birmingham, Ala.
J. A. Rutherford, New York.
Fred. W. Scott, Richmond, Va.
Moses Taylor, New York.

Executive Officers and Managers of Plants:

E. O. Hopkins, president.
J. M. Lewis, assistant to president.
E. W. Rucker, vice-president.
J. W. McQueen, secretary and treasurer, in charge of sales department.
E. H. Schoolar, auditor.
Gentry Hillman, Sheffield and Florence furnaces.
Priestly Toulmin, general manager.
A. G. Palmer, general agent traffic and sales departments.
J. H. Means, furnace manager.

Products :

Coal.
Iron ore.
Coke.
Pig iron.

Productive Capacity :

Pig iron, with all furnaces in blast, 350,000 tons.
Coal, 5000 tons per day, to be largely increased by opening new field, building coke ovens, &c.
Coke, at present 375,000 tons per annum.

Improvements or Additions Under Way :

500 coke ovens on Hattie Ensley property.

Sales Agents or Offices at Home or Abroad :

J. K. Dimick & Co., Philadelphia.
Hugh W. Adams & Co., New York.
Hugh W. Adams & Co., Boston.
Miller, Wagoner, Fleser & Co., Chicago.
T. A. Mack, Cincinnati, Ohio.
J. R. Lehmer, Omaha.
C. L. Baum, Salt Lake City.
Martin Pipe & Foundry Company, San Francisco.
Hasam & Moreno, Mexico.
William Jacks & Co., Glasgow, Scotland.

Purchasing Agent :

Henry Hilden, Birmingham.

Standard Chain Company.

Title :

Standard Chain Company.

Date of Organization :

Incorporated February 2, 1890; organized March 14, 1900.

Capital Stock Authorized :

\$1,500,000 7 per cent. non-cumulative preferred stock.
\$1,500,000 common stock.

Capital Stock Issued :

Preferred\$1,001,400
Common\$1,267,200

Bonded Indebtedness :

Authorized \$700,000 6 per cent. gold 20-year sinking fund mortgage bonds. Amount issued, \$608,000.

Dividends Declared and Dates Thereof :

None. ON PREFERRED.
None. ON COMMON.

Financial Statement :

As our year is not complete we have no financial statement to issue.

Registrar of Stock :

United States Mortgage & Trust Company, 59 Cedar street, New York.

Transfer Agents :

Registrar & Transfer Company, 32 Liberty street, New York.

Properties and Plants Owned :

Baker Chain & Wagon Iron Mfg. Company, Allegheny, Pa.
P. Hayden Saddlery Hardware Company, Columbus, Ohio.
Garland Chain Company, Rankin Station, Pa.
Bower & Mallery, Carlisle, Pa.
Nes Chain Mfg. Company, York, Pa.
John C. Schmidt & Co., York, Pa.
Franz Krein Chain Company, St. Mary's, Ohio.
Franz Krein Mfg. Company, Marion, Ind.
Lebanon Chain Works, Lebanon, Pa.
Falls City Chain Works, Jeffersonville, Ind.
H. P. Nail Works of American Steel & Wire Company, Cleveland, Ohio, being their machinery and good will of the chain manufacturing business.
In addition to the above, a new plant has been built at Braddock Station, Pa., at a cost of \$105,000.

Products :

All grades of hand made and machine made chain, including common coil, B. B., B. B. B., stud link, conveyor, ships' cables, dredge, wheel, block, dimension chain, log chain, lumber chain, rafting dogs, car brake chain, railroad switch chain, special steel loading chain, wagon chain, repair

links, lap links and rings, traces, butt chain, stage traces, lumber heel chain, breast chain, well chain, cart back chain, cow ties, breeching chain, hobble chain, tug chain, hame clips, breeching bolts, joining, connecting and anchor shackles. Bar iron and steel and 12 and 16 pound T rails.

Productive Capacity :

25,000 tons chain iron, bar iron and steel at our Columbus Rolling Mill.
20,000 tons of chain.

Improvements or Additions Under Way :

We have recently completed a new plant at Braddock Station, Pa., at a cost of \$105,000. A new foundry at Lebanon, Pa., and an iron warehouse at Columbus, Ohio.

Headquarters :

First National Bank Building, Pittsburgh, Pa.

Executive Committee :

John C. Schmidt.
A. S. White.
J. T. Davis.
Robert Garland.
Charles H. Hayden.

Board of Directors :

John C. Schmidt.
J. T. Davis.
Charles H. Hayden.
Peter Wertz.
Franz Krein.
Eli Attwood.
Robert Garland.
A. S. White.
Oscar L. Gubelman.
Harry W. Oliver.
Charles R. Flint.
Frederick F. Culver.

Executive Officers and Managers of Plants :

John C. Schmidt, president.
A. S. White, vice-president.
J. T. Davis, general manager.
Robert Garland, secretary and general sales agent.
Robert Rigney, treasurer.
Wm. Robertson, assistant treasurer.
F. D. Mitchell, auditor.
C. L. Hoff, manager, Schmidt plant, York, Pa.
M. A. Mitzell, manager, Nes plant, York, Pa.
R. C. Krein, manager, Krein plant, St. Mary's, Ohio.
Frank Krein, manager, Krein plant, Marion, Ind.
N. B. Marple, manager, Hayden plant.
Peter Wertz, manager, Carlisle plant, Carlisle, Pa.
David T. Robling, manager, Braddock Station plant, Braddock Station, Pa.
Eli Attwood, manager, Lebanon Chain Works, Lebanon, Pa.

Standard Sanitary Mfg. Company.

Title:

Standard Sanitary Mfg. Company.

Date of Organization:

January 1, 1900.

Capital Stock Authorized:

Preferred (7 per cent. non-cumulative)....\$2,500,000
Common (par, \$100).....\$2,500,000

Capital Stock Issued:

Preferred\$2,000,000
Common\$2,160,000

Bonded Indebtedness:

\$2,500,000 6 per cent. gold debenture bonds, of which
\$1,804,000 have been issued.

Dividends Declared and Dates Thereof:

ON PREFERRED.

None.

ON COMMON.

None.

Registrar of Stock:

Union Trust Company, Pittsburgh, Pa.

Transfer Agents:

Registrar & Transfer Company, Jersey City, N. J.

Properties and Plants Owned:

Ahrens & Ott Mfg. Company, Incorporated, Louisville, Ky.

Bulck & Sherwood Mfg. Company, Detroit, Mich.

Dawes & Myler, New Brighton, Pa.

Pennsylvania Bathtub Company, Ellwood City, Pa.

Sanitary Mfg. & Enameling Company, Muncie, Ind.

Standard Mfg. Company, Pittsburgh, Pa.

Victor Mfg. Company, Aliquippa, Pa.

Purchased the sanitary business of:

Cribben & Sexton Company, Chicago, Ill.

Jacob J. Vollrath Mfg. Company, Sheyboygan, Wis.

Products:

Bathtubs (enameled iron).

Lavatories.

Slop sinks.

Water closets.

Enameled soil pipe fittings.

Brass goods.

Wood work.

Steel tubs.

Headquarters:

Pittsburgh, Pa.

Board of Directors:

Theo. Ahrens, Jr.
Oscar Marschuetz.
Junius C. Klein.
Francis J. Torrance.
James W. Arrott.
Chas. F. Arrott.
Henry Cribben.

Edward L. Dawes.
W. A. Myler.
M. T. Homer.
A. J. Vollrath.
David D. Buick.
James C. Young.

Executive Officers:

Theo. Ahrens, Jr., president, Louisville, Ky.
Francis J. Torrence, first vice-president and chairman of Executive Committee, Pittsburgh, Pa.
Henry Cribben, second vice-president, Chicago, Ill.
J. W. Arrott, treasurer, Pittsburgh, Pa.
W. A. Myler, secretary, New Brighton, Pa.

Managers of Plants:

E. L. Dawes, general manager of all plants.
C. F. Arrott, Standard Mfg. Company, Pittsburgh, Pa.
E. L. Dawes, Dawes & Myler Works, New Brighton, Pa.
Theo. Ahrens, Jr., Ahrens & Ott Mfg. Company, Louisville, Ky.
David D. Buick, Buick & Sherwood Mfg. Company, Detroit, Mich.

Purchasing Agent:

W. A. Myler, Pittsburgh, Pa.

Susquehanna Iron & Steel Company.

Title:

Susquehanna Iron & Steel Company.

Date of Organization:

June, 1890, under laws of Pennsylvania.

Capital Stock Authorized:

Preferred (par, \$5).....\$1,500,000

Capital Stock Issued:

Preferred\$1,500,000

Bonded Indebtedness:

None.

Dividends Declared and Dates Thereof:

ON PREFERRED.

No. 1, paid.....\$90,000

No. 2, paid.....\$90,000

No. 3, paid.....\$45,000

No. 4, July 16, 1900.....\$45,000

No. 5, October 22, 1900.....\$45,000

Financial Statement:

BALANCE SHEET, JUNE 30, 1900.

Assets.

Plants and improvements...\$1,138,253.13

Accounts receivable 192,579.13

Merchandise 433,976.79

Cash on hand..... 26,125.35

Total\$1,790,934.40

Liabilities.

Capital stock\$1,500,000.00

Accounts payable 128,035.06

Net profits 162,899.34

Total\$1,790,934.40

Note.

Surplus June 30, 1900, as
above \$162,899.34

Less dividend No. 4, paid

July 16 45,000.00

Surplus after paying all
dividends \$117,889.34

Treasurer's report of the net results of operating the
several plants during the year ending June 30,
1900:

AURORA FURNACE.

Sales \$330,195.68

Operating expenses 276,582.36

Net profit \$53,613.32

VESTA FURNACE.

Sales \$273,454.67

Operating expenses 204,253.10

Net profit \$69,201.57

COLUMBIA ROLLING MILL.	
Sales	\$520,063.19
Operating expenses	443,915.13
Net profit.....	\$76,148.06
COLUMBIA IRON COMPANY.	
Sales	\$595,632.02
Operating expenses.....	496,760.78
Net profit.....	\$98,871.24
SUSQUEHANNA IRON COMPANY.	
Sales	\$429,054.36
Operating expenses.....	395,992.01
Net profit.....	\$33,062.35
JANSON IRON COMPANY.	
Sales	\$366,363.04
Operating expenses.....	308,682.37
Net profit.....	\$57,680.67
Total net profits of the above six plants.....	\$388,577.21
YORK ROLLING MILL.	
Operating expenses.....	\$144,783.59
Sales	144,105.72
Net loss	\$677.87
Net profits of entire opera- tions	\$387,899.34
Out of which we have paid the following dividends:	
No. 1.....	\$90,000.00
No. 2.....	90,000.00
No. 3.....	45,000.00
No. 4.....	45,000.00
	\$270,000.00
Net surplus after paying all dividends.....	\$117,899.34
Properties and Plants Owned:	
Aurora Furnace company, Wrightsville, Pa. Ac- quired for \$125,000.	
Columbia Iron Company, Columbia, Pa. Acquired for \$170,000.	

Columbia Rolling Mill Company, Columbia, Pa. Ac-
quired for \$255,000.

Janson Iron Company, Columbia, Pa. Acquired for
\$68,435.

Susquehanna Iron Company, Susquehanna, Pa. Ac-
quired for \$165,000.

Stacey & Denny Company, York, Pa. Acquired for
\$290,000.

Blast Furnaces.

Aurora Furnace at Wrightsville, Pa.

Vesta Furnace, Vesta, Pa.

Rolling Mills.

Columbia, Columbia, Pa.

West End, Columbia, Pa.

Susquehanna, Columbia, Pa.

Union Steel Mill, Columbia, Pa.

York Mill, York, Pa.

Products :

Pig iron.
Merchant bars.
Plates.
Skelp.

Productive Capacity :

50,000 tons annually of rolled products.

Headquarters :

Columbia, Pa.
Philadelphia, Girard Building, Pa.

Board of Directors :

Dr. L. S. Filbert.
Charles A. Porter.
H. F. Bruner.
John A. Denney.
J. William Steacy.
W. S. Kimball.
R. J. Houston.
Percy M. Chandler.

Executive Officers and Managers of Plants :

Charles A. Porter, president.
R. Y. Filbert, secretary and treasurer.
John Q. Denney, general manager.

Tennessee Coal, Iron & Railroad Company.

Title :

Tennessee Coal, Iron & Railroad Company.

Date of Organization :

1860, as Tennessee Coal & Railroad Company, under
laws of Tennessee.

Capital Stock Authorized :

Common

Capital Stock Issued :

Common

Bonded Indebtedness :

Outstanding December 30, 1899:

South Pittsburgh, purchase, 6 per cent., due
February 1, 1902..... \$119,830

Pratt C. & I., 7 per cent., due November 1,
1903

Alice Furn. Company, 7 per cent., maturing
1894-1902

De Bardeleben Co. & I., 6 per cent., matur-
ing February 1, 1910.....

Birmingham Div., 6 per cent., maturing
January 1, 1917.....

Tennessee Div., 6 per cent., maturing
January 1, 1917.....

Cahaba C. Mining, 6 per cent., maturing
December 1, 1922.....

Contingent liability:

Guarantee 6 per cent. on \$1,100,000 Alabama Steel
& Shipbuilding Company bonds, maturing 1929.

Dividends Declared and Dates Thereof :

ON COMMON.

2 per cent., each, April, July, October.

Financial Statement :

GENERAL BALANCE SHEET, DECEMBER 30, 1899.

Assets.

Land account..... \$20,902,158.51

Permanent investments:

Collieries, coke ovens
and plant..... \$2,793,299.99

Blast furnaces and plant 4,841,734.55

Railroads and equip-
ment

Foundry, machine
shops, saw mill and
machinery

Dwellings, storehouses,
depots, offices, sta-
bles, &c.....

Ore mines, rock quar-
ries and plant.....

Prisons and equipment..

Live stock.....

Miscellaneous office fur-
niture, telephones, &c.

9,185,981.56

Stocks and bonds of other companies.	262,863.88	
Treasury bonds.....	59,000.00	
Sundry debtors on open account	\$2,006,781.90	
Less, remitted on account by agents.....	797,960.95	
		1,208,811.95
Inventory accounts:		
Salable	\$431,282.95	
Convertible	76,409.18	
Consumable	363,883.64	
		871,575.77
Cash items:		
Bills receivable.....	\$607,212.03	
Cash in branch offices...	3,533.98	
Cash in bank.....	360,840.96	
		971,586.97
Suspense accounts.....		403,397.13
Total		\$33,865,375.77
<i>Liabilities.</i>		
Capital stock, common..	\$20,000,000.00	
Preferred	1,000,000.00	
		\$21,000,000.00
Bonded debt:		
Bonds in circulation....	\$11,066,500.00	
Less other bonds, cash and securities held by sinking fund trustees, for redemption of above bonds.....	1,988,080.73	
		9,078,419.27
Bills payable.....		1,137,707.26
Accrued interest T. C. I., not yet due for payment	213,480.84	
Matured coupons T. C. I., not presented.....	24,000.00	
		237,480.84
Accrued interest Alabama Steel & Ship Building Company, for which T. C. I. is liable	3,300.00	
Accrued dividends Alabama Steel & Ship Building Company, for which T. C. I. is liable	13,200	
		46,200.00
Sundry creditors on open account:		
Miscellaneous	\$693,766.11	
Due employees.....	209,982.21	
		903,748.32
Reserve fund:		
Rope renewals for inclines	\$968.39	
Taxes	53,699.09	
Pig iron commission....	33,443.78	
Bad debts.....	30,654.91	
Insurance	10,000.00	
		128,766.17
Outstanding orders for merchandise..		25,091.39
Profit and loss.....		1,307,962.52
Total		\$33,865,375.77

Profit and Loss Account, Year Ending December 30, 1899.

Interest accrued and paid, 1899.....	\$340,351.49	
Interest accrued, but not yet due.....	213,480.84	
		\$553,832.33
Matured coupons, not yet presented.....	24,000.00	
For account of Alabama Steel & Ship Building Company:		
Interest paid.....	\$17,562.40	
Accrued interest, due January 1.....	33,000.00—	50,562.40
Dividend paid.....	13,200.00	
Accrued dividend, due January 1.....	13,200.00—	26,400.00
Balance		1,307,962.52
Total.....		\$1,962,757.25

Balance, January 1, 1899.....	\$97,051.58
Bond premium account (profit on bonds purchased)	1,526.25
Profit upon mining and manufacturing operations for the year 1899.....	1,864,179.42
Total.....	\$1,962,757.25

Profits of the fiscal year were derived from the following sources: Pratt mines, \$251,307.07; Blue Creek, \$79,932.28; Blocton, \$89,580.51; Gamble mines, \$10,058.51; Jasper, \$731.88; Tracy City, \$20,210.84; Henry Ellen, \$2,817.37; Whitwell, \$20,365.35; Alice, \$211,551.32; Ensley \$422,177.65; Bessemer, \$435,222.83; Oxmoor, \$88,854; Sheffield, \$120,642.75; South Pittsburgh, \$116,163.79—total, \$1,864,179.42.

Transfer Agents :

Central Trust Company, New York.

Properties and Plants Owned :

Acquired: Sewanee Mining Company, Southern States Coal, Iron & Land Company, Sewanee Furnace Company, all in Tennessee.

Acquired in 1886: Alice Furnace Company, Pratt Coal & Iron Company, Limited, Iron Works, all in Alabama.

Acquired in 1892: De Bardeleben Coal & Iron Company, Cahaba Coal Mining Company, in Alabama.

Acquired in 1898: Robinson Mining Company.

Acquired in 1899: Sheffield Coal, Iron & Steel Company, Smith Mining Company, in Alabama.

Acquired in 1900: Bessemer Rolling Mill Company, in Alabama.

Coal Acreage.

	In Alabama. Acres.	In Tennessee. Acres.
Warrior coal field.....	184,638	.....
Cahaba coal field.....	72,143	.....
Tracy City coal field.....	.....	9,000
Whitwell coal field.....	.....	37,817
Totals	256,781	46,817

Ore Acreage.

Red ore.....	18,950	6,576
Brown ore.....	12,869	.....
Totals	31,819	6,576

Undeveloped Mineral Lands.

Mineral lands.....	58,428
--------------------	--------

Miscellaneous.

Lots, quarries, farm, timber lands	28,014	213
--	--------	-----

Coal Mines.

Division.	Number of mines.	Daily capacity. Net tons.
Pratt mines, Alabama.....	14	9,000
Blue Creek, Alabama.....	3	3,000
Blocton, Alabama.....	3	3,000
Henry-Ellen, Alabama.....	2	600
Sheffield, Alabama.....	2	1,000
Whitwell, Tennessee.....	3	1,200
Tracy City, Tennessee.....	3	1,200
Totals	30	19,000

Coke Ovens.

	Number of ovens.	
Pratt mines.....	1,082	1,850
Alice furnaces.....	250	400
Bessemer furnaces.....	720	1,080
Blocton collieries.....	467	800
Blue Creek collieries.....	298	450
Sheffield	301	450
Whitwell	170	250
Tracy City.....	444	720
Totals	3,732	6,000

Iron Ores.

	Number.	capacity. Daily
Red Mountain (red hematite)...	19	6,600
Inman (red hematite).....	1	200
Greely (brown ore).....	5	900
Champion (brown ore).....	2	400
Compton	1	200
Russelville (brown ore).....	1	500

Totals 29 8,800

Blast Furnaces.

Ensley, Alabama.....	5	900
Alice, Alabama.....	2	300
Oxmoor, Alabama.....	2	350
Bessemer, Alabama.....	2	800
Robertstown, Alabama.....	2	
Little Belle, Alabama.....	1	
Sheffield, Alabama.....	3	600
South Pittsburgh, Tennessee...	3	600

Totals 20 3,550

Steel Plants.

Ensley (ten 50-ton basic open hearth furnaces, 44-inch blooming mill, rail and billet mill building).....	1,000
Ensley steel casting plant (one 10-ton stationary open hearth).....	40

Rolling Mill.

Bessemer (24 puddling furnaces, 18-inch muck mill, 16-inch bar mill, 8-inch girder mill, sheet mill and plate mill).....	200
--	-----

Foundries and Machine Shops.

Linn Iron Works, Birmingham.....	40
South Pittsburg.....	40

The Semet-Solvay Company of Syracuse, N. Y., are operating a by-product coal plant at Ensley, delivering, free of charge, daily to the steel works over 1,000,000 cubic feet of cold oven gas daily. The present plant is 120 Semet-Solvay ovens, which is being doubled.

The Birmingham Cement Company have a cement plant at Ensley, Ala., which purchases granulated blast furnace clinker, the capacity of the works being 3000 barrels of cement per day.

The Tennessee Coal, Iron & Railroad Company own a majority of the stock of the Ensley Land Company of Ensley, Ala., whose property consists of 4000 acres of land and a number of dwellings.

Products :

Coal.
Coke.
Iron ore.
Pig iron, foundry, forge and basic open hearth.
Steel billets, blooms and slabs.
Spiegeleisen and ferromanganese.
Merchant bars.
Steel castings.

Production :

	1898.	1899.
Coal	3,679,534	4,151,496
Coke	992,697	1,182,286
Iron ore.....	1,219,181	1,578,442
Pig iron.....	549,457	651,145

Improvements or Additions Under Way:

Billet and rail mill at Ensley, Ala.

Headquarters :

Birmingham, Ala.

Executive Committee :

Jas. T. Woodward, chairman.
Albert B. Boardman.
Elverton R. Chapman.
David J. McComb.
Fred. H. Benedict.
Walter S. Gurnee.
Cord Meyer.
Jas. Henry Smith.
Frank S. Witherbee.
William Barbour.

Board of Directors :

Jas. T. Woodward, New York.
Albert B. Boardman, New York.
Benjamin F. Tracy, New York.
Elverton R. Chapman, New York.
David J. McComb, New York.
Fred. H. Benedict, New York.
Alfred M. Shook, Nashville, Tenn.
Frank S. Witherbee, New York.
Cord Meyer, New York.
William Barbour, New York.
Jas. Henry Smith, New York.
N. Baxter, Jr., Nashville, Tenn.
Jas. Bowron, Birmingham, Ala.
B. Y. Frost, New York.
Henry S. Manning, New York.
Oliver H. Payne, New York.

Executive Officers and Managers of Plants :

N. Baxter, Jr., president.
J. Bowron, first vice-president and treasurer.
A. M. Shook, second vice-president.
G. B. McCormack, general manager.
Erskine Ramsay, chief engineer and assistant general manager.
Jas. L. Gaines, assistant general manager in Tennessee.
J. F. Fletcher, Jr., secretary and assistant treasurer.

Sales Agents or Offices at Home and Abroad :*Domestic:*

Steel and pig iron: Matthew Addy & Co., Cincinnati, St. Louis, Chicago, New York, Pittsburgh and Philadelphia.
Coal and coke: A. H. Carpenter, Birmingham, Ala.
Rolling mill product: J. H. Mohs, Birmingham, Ala.

Foreign:

England: R. Heathfield & Co., London.
Scotland: James Watson & Co., Glasgow.
Germany, Russia and Northern Austria: Panckow & Co., Berlin.
Northern Italy and Southern Austria: Fratelli Roehling, Milan.
Holland, Belgium and Northern France: Frans Mueller, Antwerp.
Denmark, Norway and Sweden: G. L. Beijer, Malmo and Stockholm.

Purchasing Agent :

W. F. Tyler, Birmingham, Ala.

The Thomas Iron Company of Pennsylvania.

Title :

The Thomas Iron Company of Pennsylvania.

Date of Organization :

April 4, 1854.

Capital Stock Authorized :

\$2,500,000 (original capital stock \$200,000. Increased from time to time up to \$2,500,000).

Capital Stock Issued :

\$2,500,000.

Bonded Indebtedness :

None.

Dividends Declared and Dates Thereof :

ON COMMON.

Up to August 1, 1900, \$7,409,862, or 532.91 per cent. This percentage is made up on the capital stock at time of dividends. No dividend was paid until paid up stock was \$300,000.

Financial Statement :

Iron works and real estate.....	\$2,318,885.98
Iron ore mines.....	581,143.24
Pig iron, coal, coke, ores, &c., on hand at cost.....	433,091.85
Railroad stocks, &c.....	451,500.00
Cash, bills and accounts receivable.....	458,068.89
	\$4,242,689.96
Capital stock.....	\$2,500,000.00
Bills and accounts payable.....	320,341.31
Due Ironton Railroad Company.....	47,078.36
Surplus	1,375,270.29
	\$4,242,689.96

Registrar of Stock :

Stock not listed; transfers made at Easton office.

Properties and Plants Owned :

Hokendauqua furnaces, Hokendauqua, Pa.
Keystone furnace, Island Park, Pa.
Lock Ridge furnaces, Alburtis, Pa.
Saucon furnaces, Hellertown, Pa.

	Blast Furnaces.
Hokendauqua	5
Island Park.....	1
Alburtis	2
Hellertown	2
Total	10

Mount Hope Mineral Railroad (N. J.), one-third of capital stock.

Catasauqua & Fogelsville Railroad (Pa.) two-fifths of capital stock.

Saucon Valley Railroad (Pa.), all of capital stock.

Ironton Railroad (Pa.), all of capital stock.

Richard Mine, N. J., and 18 other ore and limestone properties.

Products :

Foundry.

Forge.

Bessemer.

Open hearth basic pig iron.

Productive Capacity :

250,000 gross tons yearly.

Improvements and Additions Under Way :

None.

Headquarters :

Easton, Pa.

Board of Directors :

B. F. Fackenthal, Jr., Riegelsville, Pa.
Wm. H. Hulick, New York.
Fred. R. Drake, Easton, Pa.
Samuel Thomas, Catasauqua, Pa.
W. P. Hardenbergh, New York.
J. Samuel Krause, Bethlehem, Pa.
Jos. S. Rodenbough, Easton, Pa.

Executive Officers and Managers of Plants :

B. F. Fackenthal, Jr., president and general manager.
Wm. H. Hulick, vice-president.
James W. Weaver, secretary and treasurer.
D. H. Thomas, general superintendent.
F. H. Knight, division superintendent.
Daniel Davis, division superintendent.
Horace Boyd, division superintendent.
James Arthur, division superintendent.

Sales Agents or Offices at Home and Abroad :

City office, Easton, Pa.
Wm. R. Thomas, 50 Wall street, New York.
P. E. Wright, 703 Stephen Girard Building, Philadelphia.

Purchasing Agent :

D. W. McFetridge, Hokendauqua, Pa.

United States Cast Iron Pipe & Foundry Company.

Title :

United States Cast Iron Pipe & Foundry Company.

Date of Organization :

March 13, 1899.

Capital Stock Authorized :

Preferred (7 per cent., non-cumulative)...\$15,000,000
Common (Par, \$100).....\$15,000,000

Capital Stock Issued :

Preferred

Common

Dividends Declared and Dates Thereof :

ON PREFERRED.

1½ per cent., December 1, 1899.
1½ per cent., March 1, 1900.
1½ per cent., June 1, 1900.

ON COMMON.

None.

Registrar of Stock :

Central Trust Company, New York.

Transfer Agents :

Thomas & Post, 71 Broadway, New York.

Properties and Plants Owned :

Lake Shore Foundry, Cleveland, Ohio.
McNeal Pipe & Foundry Company, Burlington, N. J.
National Foundry & Pipe Works, Limited, Scottdale, Pa.
Buffalo Cast Iron Pipe Company, Buffalo, N. Y.
Ohio Pipe Company, Columbus, Ohio.
Addyston Pipe & Steel Company, plants at Addyston, Ohio, and Newport, Ky.
Dennis Long & Co., Louisville, Ky.
American Pipe & Foundry Company, plants at Chattanooga, Tenn.; South Pittsburgh, Tenn.; Bessemer, Ala.; Anniston, Ala.; Bridgeport, Ala.
Wisconsin Steel Company, West Superior, Wis.
Charlotte Furnace, Scottdale, Pa., leased to Corrigan, McKinney & Co., Cleveland.

Products :

Cast iron pipe.
Special castings.
General foundry work.

Productive Capacity :

450,000 tons annually.

Improvements or Additions Under Way :

None.

Headquarters :

Chicago, Ill.

Executive Committee :

John R. Walsh.
A. H. Hinkle.
A. N. Brady.
Colgate Hoyt.
Samuel Thomas.

Board of Directors :

Samuel Thomas.
Geo. B. Hayes.
A. H. McNeal.
Geo. J. Long.
C. E. Burke.
A. F. Callahan.
Colgate Hoyt.
John R. Walsh.
E. C. Fuller.
A. N. Brady.

A. C. Overholt.

A. H. Hinkle.

B. F. Overholt.

Executive Officers :

Samuel Thomas, president.
Geo. B. Hayes, first vice-president.
A. F. Callahan, vice-president.
B. F. Haughton, secretary and treasurer.

Managers of Plants :

Resident Managers:

A. C. Overholt, Scottsdale, Pa.
A. H. McNeal, Burlington, N. J.
Geo. J. Long, Louisville, Ky.
Geo. D. Hayes, Buffalo, N. Y.
Geo. B. Thomas, Cleveland, Ohio.
D. McLaren, Addyston, Ohio, and Newport, Ky.
Robert Kelly, West Superior, Wis.
Lyman Arms, Columbus, Ohio.
J. W. Holmes, Anniston and Bessemer, Ala.
D. Giles, Chattanooga and South Pittsburg, Tenn., and Bridgeport, Ala.

Sales Agents or Offices at Home and Abroad :

A. F. Callahan, vice-president, Chicago, Ill.
L. R. Lemoine, Eastern sales manager, Land Title Building, Philadelphia, Pa.
C. W. Gray, Southern sales manager, Chattanooga, Tenn.
Clark W. Harrison, foreign sales manager, 61 Gracechurch street, London, England.
Cuban office: Havana, Obispo 36.

The United States Projectile Company.

Title :

The United States Projectile Company.

Date of Organization :

Dec. 24, 1890.

Capital Stock Authorized :

\$500,000.

Capital Stock Issued :

\$500,000.

Bonded Indebtedness :

None.

Dividends Declared and Dates Thereof :

ON COMMON.

8 per cent. quarterly, January 1, April 1, July 1, October 1.

Properties and Plants Owned :

Land and buildings situate on water front at foot of Fifty-third street, Borough of Brooklyn.

Products :

Projectiles, both armor and semi-armor piercing; shrapnel, shell, &c.
Pressed steel pinions and cut steel gears of electric trolley systems.

Hydraulic and general forgings.

Gear cutting and general machinists.

Improvements or Additions Under Way :

Building a new machine shop, 300 x 100 feet, and remodeling the entire works.

Headquarters :

First avenue and Fifty-third street, Borough of Brooklyn.

Board of Directors :

E. W. Bliss.
Edwin Packard.
James C. Bergen.
James W. Lane.
Danl. F. Lewis.
Alexander Milne.
Arthur T. Porter.

Executive Officers and Managers of Plants :

E. W. Bliss, president.
Arthur T. Porter, vice-president and general manager.
Jas. W. Lane, treasurer.
Chas. E. Porter, assistant treasurer and secretary.

Virginia Iron, Coal & Coke Company.

Title :

Virginia Iron, Coal & Coke Company.

Date of Organization :

January, 1890, under laws of Virginia.

Capital Stock Authorized :

Common (par, \$100).....\$10,000,000

Bonded Indebtedness :

\$10,000,000 first mortgage 5 per cent. 50-year gold V.
I. C. C. bonds, payable March 1 and September 1.

Dividends Declared and Dates Thereof :

ON PREFERRED.

None.

ON COMMON.

None.

Financial Statement :

None issued to date.

Registrar of Stock :

Chase National Bank of New York.

Transfer Agents :

Manhattan Trust Company of New York.

Properties and Plants Owned :

Watts Steel & Iron Company, Middlesboro, Ky., 2 furnaces, 7 25-ton open hearth furnaces, 32-inch blooming mill and 22-inch train.
Dora Furnace Company, Pulaski, Va., 1 furnace.
Max Meadows Iron Company, Max Meadows, Va., 1 furnace.
Radford Crane Iron Company, Radford, Va., 1 furnace.
Graham Furnace Company, Graham, Va., 1 furnace.
Salem Furnace Company, Salem, Va. (furnace dismantled).
Buena Vista Iron & Steel Company, Buena Vista, Va., 1 furnace.
Crozer Iron Company, Roanoke, Va., 2 furnaces.
Bristol Iron & Steel Company, Bristol, Va., 1 furnace.
Embreeville Iron Company, Limited, Embreeville, Tenn., 1 furnace.
Carnegie Furnace Company, Johnson City, Tenn., 1 furnace.
Foundry and machine shop at Embreeville, Tenn.
Crescent Horse Shoe & Iron Company, Max Meadows, Va., rolling mill and horseshoe factory.
2 charcoal furnaces on Cripple Creek.
Reed Island Iron Company, Reed Island, Va.
Locust Hill Mining Company, Max Meadows, Va.
Foster Falls Mining & Mfg. Company, Foster Falls, Va.
Wythe & Speedwell Iron & Mfg. Company.
Edith Mining Company.
Blue Ridge Mining Company.
Consolidated Coal Land & Mining Company.
Wheeler Mining Company.
Virginia & Tennessee Coal & Iron Company.
Tom's Creek Coal & Coke Company, Tom's Creek, Va., 750 ovens.
Wise County Coke Company.
Speedwell Coal & Coke Company.
Coeburn Coal & Coke Company.
Coeburn Colliery Company.
Kentucky Coal & Coke Company.

Jones Coal & Coke Company.

Swansea Coal & Coke Company.

Pine Run Coal & Coke Company.

Sexton Coal & Coke Company.

Lee Coal & Coke Company.

Looney Creek, Gilley, Va., 200 ovens.

Virginia & Southwestern Railway Company, 130 miles in operation; C. Shields, vice-president and general manager. Controlled stock, \$1,000,000; bonds, \$1,000,000 5 per cent. 50-year gold.

Chattanooga Ore Company, Brano, Ga.

Products :

Coal.

Coke.

Pig iron.

Steel billets.

Horseshoes.

Bars.

Castings.

Pipe (Radford Pipe Works).

Cars (mine).

Productive Capacity :

Pig iron, 500,000 tons annually.

Horseshoes, 5000 tons annually.

Coal, 1,250,000 tons annually.

Coke, 450,000 tons annually.

Steel billets, 100,000 tons annually.

Bar iron, 3000 tons annually.

Pipe, 25,000 tons annually.

Improvements or Additions Under Way :

Construction of coke ovens.

Improvement of furnaces.

Opening of mines.

Building of railroads and branches.

Foundries and machine shops.

Headquarters :

Bristol, Va.

Executive Committee :

Grant B. Schley.

E. J. Berwind.

Chas. B. Squier.

Board of Directors :

Geo. L. Carter.

Grant B. Schley.

Geo. A. Crocker.

Chas. B. Squier.

E. J. Berwind.

Henry K. McHarg.

Executive Officers and Managers of Plants :

G. L. Carter, president, Bristol, Va.

C. Shields, vice-president and general manager, Bristol, Va.

E. B. Craig, treasurer, Bristol, Va.

W. R. Wills, secretary and assistant treasurer, Bristol, Va.

C. L. E. De Gaugue, assistant secretary, 80 Broadway, New York.

D. Davies, auditor, Bristol, Va.

Sales Agents or Officers at Home or Abroad :

F. M. Eaton, sales agent, Bristol, Va.

Purchasing Agent :

J. Warwick, Bristol, Va.

Warwick Iron & Steel Company.

Title :

Warwick Iron & Steel Company.

Date of Organization :

June 9, 1899. Succeeded to the business of the Warwick Iron Company, a corporation in successful operation from 1873.

Capital Stock Authorized :

\$1,500,000.

Capital Stock Issued :

\$1,413,270.

Bonded Indebtedness :

None.

Dividends Declared and Dates Thereof :

2 per cent., August 10, 1899.

2½ per cent., November 10, 1899.

2½ per cent., February 10, 1900.

2½ per cent., May 10, 1900.

2½ per cent., August 10, 1900.

2 per cent., November 10, 1900.

"Capital stock" issued is neither "preferred" nor "common" in the general acceptance of the terms used at present.

Financial Statement :

PROFIT AND LOSS ACCOUNT, JULY 1, 1900.

Cr. for year ending this date.....\$294,945.48

Dr., sundry charges..... \$9,651.34

Dividends, 9½ per cent..... 95,000.00 104,651.34

\$190,294.14

Registrar of Stock :

Real Estate Title Insurance & Trust Company, Philadelphia.

Transfers :

At the company's office, Room 619, Girard Trust Building, Philadelphia.

Products :

"Warwick" brands of Lake ore, foundry and neutral mill pig iron.

Upon the completion of casting machine (now in course of erection), will be in position to furnish "sandless" pig iron of all grades, including basic.

Productive Capacity :

Present furnace, 65,000 tons.

New furnace, 120,000 tons.

Improvements or Additions Under Way :

New blast furnace.

Properties and Plants Owned :

One blast furnace, and a new blast furnace, in course of erection, embracing all the modern appliances and labor saving devices, which will be put in blast early in 1901. With all necessary railroad sidings connecting to Philadelphia & Reading Railway Main Line and Pennsylvania Railroad, Schuylkill Division.

Acreage, 150.

Headquarters :

Pottstown, Montgomery County, Pa.

Executive Committee :

Edgar S. Cook.

W. S. Pilling.

Harry C. Francis.

F. W. Tunnell.

Board of Directors :

Edgar S. Cook.

W. S. Pilling.

Wm. H. Shelmerdine.

F. W. Tunnell.

Harry C. Francis.

Jacob Rech.

F. H. Bachman.

Executive Officers and Managers of Plants :

Edgar S. Cook, president and general manager.

G. W. Nicolls, secretary and treasurer.

Sales Agents or Offices at Home and Abroad :**New England States :**

C. L. Peirson & Co., 44 Kilby street, Boston, Mass., and 16 Exchange place, New York City.

J. Wesley Pullman, 238 South Third street, Philadelphia.

Pilling & Crane, 612 Girard Trust Building, Philadelphia.

INDEX OF CONSTITUENT COMPANIES.

A.

Acme Mfg. Co. See American Bicycle Co.
 Addyston Pipe & Steel Co. See United States Cast Iron Pipe & Foundry Co.
 Aetna-Standard Iron & Steel Co. See American Steel Hoop Co.
 Aetna-Standard Iron & Steel Co. See American Tin Plate Co.
 Aetna-Standard Iron & Steel Co. See National Steel Co.
 Aetna-Standard Iron & Steel Co. See American Sheet Steel Co.
 Ahrens & Ott Mfg. Co. See Standard Sanitary Mfg. Co.
 Ahrens & Ott Mfg. Co. See Central Foundry Co.
 Alabama Pipe Co. See Central Foundry Co.
 Alabama Rolling Mill Co. See Republic Iron & Steel Co.
 Alabama Steel & Shipbuilding Co. See Tennessee Coal, Iron & Railroad Co.
 Albany Mfg. Co. See Shelby Steel Tube Co.
 Alder Brown Ore. See Sloss-Sheffield Iron & Steel Co.
 Alice Furnace Co. See Tennessee Coal, Iron & Railroad Co.
 Aliquippa Steel Works. See Crucible Steel Co. of America.
 Allegheny Furnace Co. See American Steel & Wire Co.
 Allison Mfg. Co. See National Tube Co.
 American Bridge Works. See American Bridge Co.
 American Coke Co. See American Steel & Wire Co.
 American Mining Co. See American Steel & Wire Co.
 American Pipe & Foundry Co. See United States Cast Iron Pipe & Foundry Co.
 American Stamping Co. See National Enameling & Stamping Co.
 American Supply Co. See American Steel & Wire Co.
 American Tin Plate Co., Elwood, Ind. See American Tin Plate Co.
 American Tin Plate Co., Montpelier, Ind. See American Tin Plate Co.
 American Tube & Iron Co. See National Tube Co.
 Ames & Frost Co. See American Bicycle Co.
 Anderson, Dupuy & Co. See Crucible Steel Co. of America.
 Andrews Bros. Co. See Republic Iron & Steel Co.
 Anschutz-Bradberry Co. See Pittsburgh Stove & Range Co.
 Apollo Iron & Steel Co. See American Sheet Steel Co.
 Atlanta Steel & Tin Plate Co. See American Tin Plate Co.
 Atlantic Furnace. See Republic Iron & Steel Co.
 Atlas and Mahoning Coke Plants. See Cambria Steel Co.
 Atwood & McCaffrey. See Pittsburgh Valve, Foundry & Construction Co.
 Aurora Furnace Co. See Susquehanna Iron & Steel Co.

B.

Benjamin Atha & Illingworth Co. See Crucible Steel Co. of America.
 Baker Chain & Wagon Iron Mfg. Co. See Standard Chain Co.
 Baldwin & Graham. See Pittsburgh Stove & Range Co.
 Baltimore Tin Plate Co. See American Tin Plate Co.
 Barbour Silver Co. See International Silver Co.
 De Bardeleben Coal & Iron Co. See Tennessee Coal, Iron & Railroad Co.
 Bay City Ship Building Co. See American Ship Building Co.
 Beach & Co. See Central Foundry Co.
 Beaver Falls Steel Works. See Crucible Steel Co. of America.

Beaver Tin Plate Co., Lisbon, Ohio. See American Tin Plate Co.
 Bell Mfg. Co. See Central Foundry Co.
 Bellaire Steel Co. See National Steel Co.
 Berlin Iron Bridge Co. See American Bridge Co.
 Bement, Miles & Co. See Niles-Bement-Pond Co.
 Bessemer Mine. See Republic Iron & Steel Co.
 Bessemer Rolling Mill Co. See Tennessee Coal, Iron & Railroad Co.
 Bethlehem Iron Co. See Bethlehem Steel Co.
 Bignall Mfg. Co. See Central Foundry Co.
 Bimetallic Smelting Co. See American Smelting & Refining Co.
 Bissell & Co. See Pittsburgh Stove & Range Co.
 Black Diamond Steel Works. See Crucible Steel Co. of America.
 Black Mfg. Co. See American Bicycle Co.
 Blairsville Rolling Mill & Tin Plate Co. See American Tin Plate Co.
 Blake & Knowles Steam Pump Works. See International Steam Pump Co.
 Blessing, C. A. See Central Foundry Co.
 Blue Ridge Mining Co. See Virginia Iron, Coal & Coke Co.
 Blunt Mfg. Co. See Magnus Metal Co.
 Bower & Mallery. See Standard Chain Co.
 Boyer Ore Mines. See Empire Steel & Iron Co.
 Bradley, A., & Co. See Pittsburgh Stove & Range Co.
 Brady Metal Co. See Magnus Metal Co.
 Bristol Iron & Steel Co. See Virginia Iron, Coal & Coke Co.
 Britton Rolling Mill Co. See American Tin Plate Co.
 Brown-Bonnell Iron Co. See Republic Iron & Steel Co.
 Buena Vista Iron & Steel Co. See Virginia Iron, Coal & Coke Co.
 Buffalo Brass Co. See Magnus Metal Co.
 Buffalo Bridge & Iron Works. See American Bridge Co.
 Buffalo Car Mfg. Co. See American Car & Foundry Co.
 Buffalo Cast Iron Pipe Co. See United States Cast Iron Pipe & Foundry Co.
 Buffalo Cycle Mfg. Co. See American Bicycle Co.
 Buffalo Dry Dock Co. See American Shipbuilding Co.
 Buhl Steel Co. See National Steel Co.
 Buick & Sherwood Mfg. Co. See Standard Sanitary Mfg. Co.
 Burgess Steel & Iron Works. See Crucible Steel Co. of America.

C.

Cahaba Coal Mining Co. See Tennessee Coal, Iron & Railroad Co.
 Cambria Iron Co. See Cambria Steel Co.
 Cambria Mining Co. See Republic Iron & Steel Co.
 Cambridge Iron & Steel Co. See American Sheet Steel Co.
 Canton Rolling Mill Co. See American Sheet Steel Co.
 Carnegie Furnace Co. See Virginia Iron, Coal & Coke Co.
 Carnegie Natural Gas Co. See Carnegie Co.
 Carnegie Steel Co. See Carnegie Co.
 Carrie Furnaces. See Carnegie Co.
 Carton Furnace Co. See International Heater Co.
 Cassidy & Adler. See Central Foundry Co.
 Catasauqua & Fogelsville Railroad. See Thomas Iron Co.
 Central Iron & Steel Co. See Republic Iron & Steel Co.
 Charlotte Furnace Co. See United States Cast Iron Pipe & Foundry Co.
 Chartiers Iron & Steel Co. See American Sheet Steel Co.

Chattanooga Ore Co. See Virginia Iron, Coal & Coke Co.
 Cherry Valley Iron Works. See Republic Iron & Steel Co.
 Chester Pipe & Tube Co. (part). See National Tube Co.
 Chester Rolling Mill Co. See American Sheet Steel Co.
 Chicago & Aurora Smelting & Refining Co. See American Smelting & Refining Co.
 Chicago Ship Building Co. See American Ship Building Co.
 Christy, H. A., & Co. See American Bicycle Co.
 Cincinnati Barb Wire Fence Co. See American Steel & Wire Co.
 Cincinnati Rolling Mill & Tin Plate Co. See American Tin Plate Co.
 Clark, Wm., Sons & Co. See American Steel Hoop Co.
 Clay, Henry, Furnaces. See Empire Steel & Iron Co.
 Cleveland Machine Screw Co. See American Bicycle Co.
 Cleveland Rolling Mill Co. See American Steel & Wire Co.
 Cleveland Ship Building Co. See American Ship Building Co.
 Cliff Mines. See American Steel & Wire Co.
 Clifton Iron Co. See Alabama Consolidated Coal & Iron Co.
 Coeburn Coal & Coke Co. See Virginia Iron, Coal & Coke Co.
 Coeburn Colliery Co. See Virginia Iron, Coal & Coke Co.
 Cohoes Tube Works. See National Tube Co.
 Colorado & Wyoming Railroad Co. See Colorado Fuel & Iron Co.
 Colorado Smelting Co. See American Smelting & Refining Co.
 Columbia Iron Co. See Susquehanna Iron & Steel Co.
 Columbia Iron & Steel Co. See National Steel Co.
 Columbia Rolling Mill Co. See Susquehanna Iron & Steel Co.
 Connellsville Coke Co. See Republic Iron & Steel Co.
 Consolidated Barb Wire Co. See American Steel & Wire Co.
 Consolidated Coal Lands & Mining Co. See Virginia Iron, Coal & Coke Co.
 Consolidated Kansas City Smelting & Refining Co. See American Smelting & Refining Co.
 Continental Coke Co. See National Steel Co.
 Corning Steel Co. See American Sheet Steel Co.
 Corns Iron & Steel Co. See Republic Iron & Steel Co.
 Coshocton Rolling Mill Co. See American Sheet Steel Co.
 Craigsville Limestone Quarry. See Empire Steel & Iron Co.
 Crane Iron Works. See Empire Steel & Iron Co.
 Crawford Mfg. Co. See American Bicycle Co.
 Crea, Graham & Co. See Pittsburgh Stove & Range Co.
 Crescent Horse Shoe & Iron Co. See Virginia Iron, Coal & Coke Co.
 Crescent Sheet & Tin Plate Co. See American Tin Plate Co.
 Crescent Steel Works. See Crucible Steel Co. of America.
 Cribben & Sexton Co. See Standard Sanitary Mfg. Co.
 Cripple Creek Furnaces. See Virginia Iron, Coal & Coke Co.
 Croton Lime Co. See Republic Iron & Steel Co.
 Crown Point Iron Co. See American Steel & Wire Co.
 Crozer Iron Co. See Virginia Iron, Coal & Coke Co.
 Crystal River Railroad Co. See Colorado Fuel & Iron Co.
 Cumberland Steel & Tin Plate Co. See American Tin Plate Co. See Crucible Steel Co. of America.

D.

Dale Limestone Works. See Republic Iron & Steel Co.
 Dawes & Myler. See Standard Sanitary Mfg. Co.
 Deane Steam Pump Works. See International Steam Pump Co.

De Bardeleben Coal & Iron Co. See Tennessee Coal, Iron & Railroad Co.
 De Haven & Co. See Pittsburgh Stove & Range Co.
 Dennis Long & Co. United States Cast Iron Pipe & Foundry Co.
 Dennison Rolling Mill Co. See American Sheet Steel Co.
 Derby Silver Co. See International Silver Co.
 Detroit Ship Building Co. See American Ship Building Co.
 Diamond State Iron Co. See Diamond State Steel Co.
 Dora Furnace Co. See Virginia Iron, Coal & Coke Co.
 Dresden Iron & Steel Sheet Co. See American Sheet Steel Co.
 Duquesne Steel Works. See Carnegie Company.

E.

Eagle Iron & Steel Co. See Republic Iron & Steel Co.
 East Lebanon Iron Co. See American Iron & Steel Mfg. Co.
 Eastern Tin Ware Co. See National Enameling & Stamping Co.
 Edgar Zinc Co. See American Steel & Wire Co.
 Edge Moor Bridge Works. See American Bridge Co.
 Edith Mining Co. See Virginia Iron, Coal & Coke Co.
 Elgin, Joliet & Eastern Railway Co. See Federal Steel Co.
 Ellwood Tin Plate Co. See American Tin Plate Co.
 Elmira Bridge Co. See American Bridge Co.
 Embreeville Iron Co. See Virginia Iron, Coal & Coke Co.
 Ensign Mfg. Co. See American Car & Foundry Co.

F.

Falcon Iron & Nail Co. See American Sheet Steel Co.
 Falcon Tin Plate & Sheet Co. See American Tin Plate Co.
 Falls City Chain Works. See Standard Chain Co.
 Fay Mfg. Co. See American Bicycle Co.
 Featherstone, A., & Co. See American Bicycle Co.
 Fort Pitt Bronze Co. See Magnus Metal Co.
 Foster Falls Mining & Mfg. Co. See Virginia Iron, Coal & Coke Co.
 Fox Mountain Ore Mines. See Empire Steel & Iron Co.
 Fox Pressed Steel Equipment Company, Joliet, Ill. See Pressed Steel Car Co.
 Franklin Iron Mining Co. See Republic Iron & Steel Co.
 Frick, H. C., Coke Co. See Carnegie Co.

G.

Gadsden Furnace. See Alabama Consolidated Coal & Iron Co.
 Garden City Wire & Spring Co. See American Steel & Wire Co.
 Garland Chain Co. See Standard Chain Co.
 Gate City Ore Property. See Alabama Consolidated Coal & Iron Co.
 Geneva Cycle Co. See American Bicycle Co.
 Germania Smelting Co. See American Smelting & Refining Co.
 Gillette-Herzog Mfg. Co. See American Bridge Co.
 Globe Iron Works Co. See American Ship Building Co.
 Globe Smelting & Refining Co. See American Smelting & Refining Co.
 Gormully & Jeffery Co. See American Bicycle Co.
 Goldite Mine. See Republic Iron & Steel Co.
 Graff Co., The. See Pittsburgh Stove & Range Co.
 Graham Furnace Co. See Virginia Iron, Coal & Coke Co.
 Granite City Rolling Mills. See National Enameling & Stamping Co.
 Great Western Tin Plate Co. See American Tin Plate Co.
 Greensboro Furnace. See Empire Steel & Iron Co.
 Groton Bridge Mfg. Co. See American Bridge Co.

H.

Haberman Mfg. Co. See National Enameling & Stamping Co.
Hall Furnace. See Republic Iron & Steel Co.
Hamilton Creek Ore Co. See Sloss-Sheffield Iron & Steel Co.
Hamilton & Co. See American Tin Plate Co.
Hannah Furnace. See Republic Iron & Steel Co.
Hanauer Smelting Works. See American Smelting & Refining Co.
Hart & Cooley Mfg. Co. See American Bicycle Co.
Hartford Cycle Company. See American Bicycle Co.
Haselton Furnace. See Republic Iron & Steel Co.
Hattie Ensley Furnace. See Sloss-Sheffield Steel & Iron Co.
Hayden Saddlery Hardware Co. See Standard Chain Co.
Henry Clay Furnaces. See Empire Steel & Iron Co.
Hilton Bridge Construction Co. See American Bridge Co.
Hoffman, Billings & Weller. See Central Foundry Co.
Hokendauqua Furnace. See Thomas Iron Co.
Holmes & Edwards Silver Co. See International Silver Co.
Homestead Steel Works. See Carnegie Co.
Horseheads Bridge Co. See American Bridge Co.
Howard Axle Works. See Carnegie Co.
Howard Furnace Co. See International Heater Co.
Howe, Brown & Co., Limited. See Crucible Steel Co. of America.
H. P. Nail Works. See Standard Chain Co.
Huddleston Railroad. See Empire Steel & Iron Co.
Humphreys Mfg. Co. See Central Foundry Co.
Humbert Tin Plate Co. See American Tin Plate Co.
Hyde Park Iron & Steel Co. See American Sheet Steel Co.

I.

Illinois Malleable Iron Co. See Central Foundry Co.
Illinois Steel Co. See Federal Steel Co.
Indiana Bicycle Co. See American Bicycle Co.
Indiana Car & Foundry Co. See American Car & Foundry Co.
Indiana Forge & Rolling Mill Co. See Republic Iron & Steel Co.
Indiana Iron Co. See Republic Iron & Steel Co.
Indiana Wire Fence Co. See American Steel & Wire Co.
Indianapolis Chain & Stamping Co. See American Bicycle Co.
Inland Iron & Forge Co. See Republic Iron & Steel Co.
Irondale Sheet & Iron Co. See American Tin Plate Co.
Ironton Railroad Co. See Thomas Iron Co.
Isabella Furnace Co. See American Steel Hoop Co.

J.

Jackson & Woodin Mfg. Co. See American Car & Foundry Co.
Janson Iron Co. See Susquehanna Iron & Steel Co.
Johnstown Tin Plate Co. See American Tin Plate Co.
Jones Coal & Coke Co. See Virginia Iron, Coal & Coke Co.
Juniata Limestone Co. See Cambria Steel Co.

K.

Kentucky Coal & Coke Co. See Virginia Iron, Coal & Coke Co.
Kernan Furnace Co. See International Heater Co.
Keystone Bridge Works. See American Bridge Co.
Keystone Furnace. See Thomas Iron Co.
Kleckhefer Bros. Co. See National Enameling & Stamping Co.
Kimberly, P. L., Co. See American Steel Hoop Co.
King, Gilbert & Warner. See National Steel Co.
Kingsley Foundry Co. See Central Foundry Co.
Kirkpatrick & Co. See American Sheet Steel Co.
Krein Chain Co., Franz. See Standard Chain Co.
Krein Mfg. Co., Franz. See Standard Chain Co.

L.

La Belle Iron Works. See American Tin Plate Co.
La Belle Steel Works. See Crucible Steel Co. of America.
Lady Ensley Coal, Iron & Railroad Co. See Sloss-Sheffield Steel & Iron Co.
Lady Ensley Furnace. See Sloss-Sheffield Steel & Iron Co.
Lafayette Bridge Co. See American Bridge Co.
Laidlaw Bale Tie Co. See American Steel & Wire Co.
Laidlaw-Dunn-Gordon Co. See International Steam Pump Co.
Lake Erie Iron Co. See Republic Iron & Steel Co.
Lake Shore Foundry. See United States Cast Iron Pipe & Foundry Co.
Lamb Mfg. Co. See American Bicycle Co.
Laufman & Co. See American Sheet Steel Co.
Laughlin Nail Co. See American Tin Plate Co.
Laramie Rolling Mills. See Colorado Fuel & Iron Co.
Lebanon Chain Works. See Standard Chain Co.
Lebanon Iron Co. See American Iron & Steel Mfg. Co.
Lee Coal & Coke Co. See Virginia Iron, Coal & Coke Co.
Lessig Bridge & Iron Works. See American Bridge Co.
Lillie Mining Co. See Republic Iron & Steel Co.
Lindsay & McCutcheon. See American Steel Hoop Co.
Loch Ridge Furnaces. See Thomas Iron Co.
Locust Hill Mining Co. See Virginia Iron, Coal & Coke Co.
Lorain Steel Co. of Pennsylvania. See Federal Steel Co.
Lorain Steel Co. of Ohio. See Federal Steel Co.
Lozier, H. A., & Co. See American Bicycle Co.
Lucy Furnaces. See Carnegie Co.

M.

Macdonald, A. Y., & Morrison Co. See Central Foundry Co.
McNeal Pipe & Foundry Co. See United States Cast Iron Pipe & Foundry Co.
McShane, Henry, Mfg. Co. See Central Foundry Co.
Macungie Furnace. See Empire Steel & Iron Co.
Madison County Belt Railroad. See Republic Iron & Steel Co.
Mahoning Ore & Steel Co. See Cambria Steel Co.
Mahoning Ore & Steel Co. (part). See Republic Iron & Steel Co.
Mahoning & Shenango Dock. See Republic Iron & Steel Co.
Mahoning Valley Iron Co. See Republic Iron & Steel Co.
Manhattan Silver Plate Co. See International Silver Co.
Manning, Bowman & Co. See International Silver Co.
Marion Steel & Iron Co. See Republic Iron & Steel Co.
Marshall Bros. & Co. See American Tin Plate Co.
Mary Pratt Furnace. See Alabama Consolidated Coal & Iron Co.
Massamilton Ore Mines. See Empire Steel & Iron Co.
Matthal, Ingram & Co. See National Enameling & Stamping Co.
Max Meadows Iron Co. See Virginia Iron, Coal & Coke Co.
Meiselbach, A. D. See American Bicycle Co.
Meriden Britannia Co. See International Silver Co.
Meriden Silver Plate Co. See International Silver Co.
Michigan Peninsular Car Co. See American Car & Foundry Co.
Middletown Plate Co. See International Silver Co.
Midland Steel Co. See American Sheet Steel Co.
Midvale Foundry Co. See Central Foundry Co.
Milwaukee Dry Dock Co. See American Ship Building Co.
Minnesota Iron Co. See Federal Steel Co.
Mitchell, Tranter & Co. See Republic Iron & Steel Co.
Missouri Car & Foundry Co. See American Car & Foundry Co.
Monarch Cycle Mfg. Co. See American Bicycle Co.
Monessen Steel Co. See American Steel Hoop Co.
Monitor Iron Works, Sing Sing, N. Y. See Central Foundry Co.

Monitor Iron Works, Newark, N. J. See Central Foundry Co.
 Monongahela Tin Plate Co. See American Tin Plate Co.
 Montreal Mining Co. See National Tube Co.
 Morewood Co., The. See American Tin Plate Co.
 Morris, Tasker & Co. See National Tube Co.
 Morton Tin Plate Co. See American Tin Plate Co.
 Mott, J. L., Iron Works (Equipment). See Central Foundry Co.
 Mount Hope Mineral Railroad. See Empire Steel & Iron Co. See Thomas Iron Co.
 Mount Hope Mining Co. See Empire Steel & Iron Co.
 Mount Pleasant Water Co. See Carnegie Co.
 Muncie Iron & Steel Co. See Republic Iron & Steel Co.
 Murray, Dougal & Co. See American Car & Foundry Co.

N.

Nagney Quarry Co. See Cambria Steel Co.
 National Bolt, Nut & Rivet Works. See American Iron & Steel Mfg. Co.
 National Foundry & Pipe Works. See United States Cast Iron Pipe & Foundry Co.
 National Galvanizing Works. See National Tube Co.
 National Smelting & Refining Co. See American Smelting & Refining Co.
 National Tin Plate Co. Monessen, Pa. See American Tin Plate Co.
 National Tin Plate Co., Anderson, Ind. See American Tin Plate Co.
 National Tube Works Co. See National Tube Co.
 Negaunee Mines. See American Steel & Wire Co.
 Nes Chain Mfg. Co. See Standard Chain Co.
 Neshannock Sheet & Tin Plate Co. See American Tin Plate Co.
 Newburgh Wire & Nail Co. See American Steel & Wire Co.
 New Castle Steel & Tin Plate Co., New Castle, Pa. See American Tin Plate Co.
 New Castle Tube Co. See Shelby Steel Tube Co.
 New Columbus Bridge Co. See American Bridge Co.
 New Jersey Steel & Iron Co. See American Bridge Co.
 New Haven Rolling Mill Co. See New Haven Iron & Steel Co.
 New Philadelphia Iron & Steel Co. See American Sheet Steel Co.
 Niagara Car Wheel Co. See American Car & Foundry Co.
 Niles Tool Works Co. See Niles-Bement-Pond Co.
 North Buffalo Wheel Works. See American Bicycle Co.
 Norwich Cutlery Co. See International Silver Co.
 Nuttall Mfg. Co. See American Bicycle Co.

O.

Ohio Falls Car Mfg. Co. See American Car & Foundry Co.
 Ohio Iron Co. See National Steel Co.
 Ohio Pipe Co. See United States Cast Iron Pipe & Foundry Co.
 Ohio River Sheet & Tin Plate Co. See American Tin Plate Co.
 Ohio Steel Co. See National Steel Co.
 Ohio Tube Co. See National Tube Co.
 Oil City Tube Co. See National Tube Co.
 Oil Well Supply Co. See National Tube Co.
 Old Meadow Rolling Mill Co. See American Sheet Steel Co.
 Oliver Iron Mining Co. See Carnegie Co.
 Oliver Wire Co. See American Steel & Wire Co.
 Omaha & Grant Smelting & Refining Co. See American Smelting & Refining Co.
 Ore Hill Ore Mines. See Empire Steel & Iron Co.
 Oxford Furnace. See Empire Steel & Iron Co.
 Oxford Ore Mines. See Empire Steel & Iron Co.

P.

Painter, J., & Sons Co. See American Steel Hoop Co.
 Park Steel Co. See Crucible Steel Co. of America.
 Pease, J. F., Furnace Co. See International Heater Co.

Penn Iron Mining Co. See Cambria Steel Co.
 Pennock Brothers. See American Car & Foundry Co.
 Pennsylvania Bathtub Co. See Standard Sanitary Mfg. Co.
 Pennsylvania Bolt & Nut Co. See American Iron & Steel Mfg. Co.
 Pennsylvania Lead Co. and Pennsylvania Smelting Co. See American Smelting & Refining Co.
 Pennsylvania Tin Plate Co., New Kensington, Pa. See American Tin Plate Co.
 Pennsylvania Tube Co. See National Tube Co.
 Peoria Iron & Steel Co. See Republic Iron & Steel Co.
 Philadelphia Furnace. See Sloss-Sheffield Steel & Iron Co.
 Phoenix Foundry & Mfg. Co. See Central Foundry Co.
 Pine Run Coal & Coke Co. See Virginia Iron, Coal & Coke Co.
 Pioneer Mining & Mfg. Co. See Republic Iron & Steel Co.
 Piqua Rolling Mill Co. See American Sheet Steel Co.
 Pittsburgh & Conneaut Dock Co. See Carnegie Co.
 Pittsburgh, Bessemer & Lake Erie Railroad. See Carnegie Co.
 Pittsburgh Bridge Co. See American Bridge Co.
 Pittsburgh Limestone Co. See Carnegie Co.
 Pittsburgh Sheet Mfg. Co. See American Sheet Steel Co.
 Pittsburgh Steamship Co. See Carnegie Co.
 Pittsburgh Tube Co. See National Tube Co.
 Pittsburgh Tin Plate Co. See American Tin Plate Co.
 Pittsburgh Valve & Machine Co., Limited. See Pittsburgh Valve, Foundry & Construction Co.
 Pittsburgh Wire Co. See American Steel & Wire Co.
 Pomeroy Iron & Steel Co. See American Steel Hoop Co.
 Pond Machine Tool Co. See Niles-Bement-Pond Co.
 Pope Mfg. Co. See American Bicycle Co.
 Pope Tube Co. See Shelby Steel Tube Co.
 Potts Valley Ore Mines. See Empire Steel & Iron Co.
 Portage Iron Co. See American Steel Hoop Co.
 Portage Iron Co. See American Steel & Wire Co.
 Post & McCord. See American Bridge Co.
 Pratt Coal & Iron Co., Limited. See Tennessee Coal, Iron & Railroad Co.
 Pueblo Smelting & Refining Co. See American Smelting & Refining Co.
 Puget Sound Wire Nail & Steel Co. See American Steel & Wire Co.

R.

Radford Crane Iron Co. See Virginia Iron, Coal & Coke Co.
 Raimund Mine. See Republic Iron & Steel Co.
 Reed Island Iron Co. See Virginia Iron, Coal & Coke Co.
 Reeves Iron Co. See American Sheet Steel Co.
 Reeves Iron Co. See American Tin Plate Co.
 Regester, J., & Sons. See Central Foundry Co.
 Republic Iron & Steel Co. sheet mills outside of Alabama. See American Sheet Steel Co.
 Richard Mining Co. See Thomas Iron Co.
 Richard Mine. See Thomas Iron Co.
 Riverside Iron Works. See National Tube Co.
 A. & P. Roberts Co. (bridge works). See American Bridge Co.
 Robinson Mining Co. See Tennessee Coal, Iron & Railroad Co.
 Rochester Bridge Iron Works. See American Bridge Co.
 Rogers & Bro. See International Silver Co.
 Rogers Cutlery Co. See International Silver Co.
 Rogers, Wm., Mfg. Co. See International Silver Co.
 Rogers & Hamilton Silver Plate Co. See International Silver Co.
 Rosena Furnace Co. See National Steel Co.
 Rundle & Spence Mfg. Co. See Central Foundry Co.
 Russel, Wheeler & Son. See International Heater Co.
 Russellville Ore Co. See Sloss-Sheffield Iron & Steel Co.

S.

Salem Furnace Co. See Virginia Iron, Coal & Coke Co.
 Saltsburg Rolling Mill Co. See American Sheet Steel Co.

- Sanderson Bros. Steel Co. See Crucible Steel Co. of America.
- Sanitary Mfg. & Enameling Co. See Standard Sanitary Mfg. Co.
- San Juan Smelting & Mining Co. See American Smelting & Refining Co.
- Saucon Furnace. See Thomas Iron Co.
- Saucon Valley Railroad. See Thomas Iron Co.
- Sayreton Mine. See Republic Iron & Steel Co.
- Schmidt & Co., John C. See Standard Chain Co.
- Schoen Pressed Steel Co., Pittsburgh, Pa. See Pressed Steel Car Co.
- Schultz Bridge Iron Co. See American Bridge Co.
- Scottdale Iron & Steel Co. See American Sheet Steel Co.
- Sexton Coal & Coke Co. See Virginia Iron, Coal & Coke Co.
- Sewanee Furnace Co. See Tennessee Coal, Iron & Railroad Co.
- Sewanee Mining Co. See Tennessee Coal, Iron & Railroad Co.
- Sharon Iron Co. See American Sheet Steel Co.
- Sharon Iron Co. (furnace). See National Steel Co.
- Sharon Iron Co. See Republic Iron & Steel Co.
- Sharon Connecting Railroad. See Republic Iron & Steel Co.
- Sheffield Coal, Iron & Steel Co. See Tennessee Coal, Iron & Railroad Co.
- Shelby Cycle Mfg. Co. See American Bicycle Co.
- Shenango Valley Steel Co. (tin plate plant). See American Tin Plate Co.
- Shenango Valley Steel Co. (rod mill). See American Steel & Wire Co.
- Shenango Valley Steel Co. (steel works and blast furnaces). See National Steel Co.
- Shenandoah Furnace. See Empire Steel & Iron Co.
- Shiffler Bridge Co. See American Bridge Co.
- Ship Owners' Dry Dock Co. See American Ship Building Co.
- Shoenberger Steel Co. See American Steel & Wire Co.
- Shook-Anderson Mfg. Co. See Pittsburgh Valve, Foundry & Construction Co.
- Shuster Foundry. See Central Foundry Co.
- Simpson, Hall, Miller & Co. See International Silver Co.
- Simpson Nickel Silver Co. See International Silver Co.
- Singer, Nimick & Co. See Crucible Steel Co. of America.
- Sloss Iron & Steel Co. See Sloss-Sheffield Steel & Iron Co.
- Smith, C. J., & Sons Co. See American Bicycle Co.
- Smith Mining Co. See Tennessee Coal, Iron & Railroad Co.
- Snow Steam Pump Works. See International Steam Pump Co.
- Somers Bros. See American Tin Plate Co.
- South West Connellsville Coke Co. See Federal Steel Co.
- Southern States Coal, Iron & Land Co. See Tennessee Coal, Iron & Railroad Co.
- Spaulding, Jennings & Co. See Crucible Steel Co. of America.
- Spaulding Mine. See Republic Iron & Steel Co.
- A. Speer & Sons (Foundry). See Pittsburgh Valve, Foundry & Construction Co.
- Speedwell Coal & Coke Co. See Virginia Iron, Coal & Coke Co.
- Springfield Iron Co. See Republic Iron & Steel Co.
- Standard Coal Co. See Alabama Consolidated Coal & Iron Co.
- Standard-Connellsville Coke Co. See National Steel Co.
- Standard Mfg. Co. See Standard Sanitary Mfg. Co.
- Standard Radiator Co. See American Radiator Co.
- Standard Silver Co. See International Silver Co.
- Star Tin Plate Co. See American Tin Plate Co.
- St. Charles Mfg. Co. See Central Foundry Co.
- St. Charles Car Co. See American Car & Foundry Co.
- St. Louis Radiator Co. See American Radiator Co.
- St. Louis Stamping Co. See National Enameling & Stamping Co.
- St. Louis Tin Plate Co. See National Enameling & Stamping Co.
- Steacy & Denny Co. See Susquehanna Iron & Steel Co.
- Stearns, E. C., & Co. See American Bicycle Co.
- Sterling Cycle Works. See American Bicycle Co.
- Sternbergh, J. H., & Son. See American Iron & Steel Mfg. Co.
- Stewart Enamel Co. See National Enameling & Stamping Co.
- Stickney Iron Co. See American Tin Plate Co.
- Stiles Metal Co. See Magnus Metal Co.
- Struthers Iron & Steel Co. See American Sheet Steel Co.
- Superior Ship Building Co. See American Ship Building Co.
- Susquehanna Iron Co. See Susquehanna Iron & Steel Co.
- Swansea Coal & Coke Co. See Virginia Iron, Coal & Coke Co.
- Swett, A. L., Iron Works. See Central Foundry Co.
- Sylvan Steel Co. See Republic Iron & Steel Co.
- Syracuse Cycle Co. See American Bicycle Co.
- Syracuse Tube Co. See National Tube Co.

T.

- Taylor, E. L., & Co. See Central Foundry Co.
- Terre Haute Car & Mfg. Co. See American Car & Foundry Co.
- Terre Haute Steel & Iron Co. See Republic Iron & Steel Co.
- Thomas Furnace Co. See National Steel Co.
- Thompson, G. L., Mfg. Co. See American Bicycle Co.
- Edgar Thomson Steel Works. See Carnegie Co.
- Titusville Iron Co. See American Radiator Co.
- Toledo Rolling Mill Co. See Republic Iron & Steel Co.
- Tom's Creek Coal & Coke Co. See Virginia Iron, Coal & Coke Co.
- Topton Furnace. See Empire Steel & Iron Co.
- Trotter Water Co. See Carnegie Co.
- Tudor Iron Works. See Republic Iron & Steel Co.

U.

- Union Bridge Co. See American Bridge Co.
- Union Car Foundry Co. See American Car & Foundry Co.
- Union Iron & Steel Co. See American Steel Hoop Co.
- Union Limestone Works. See Republic Iron & Steel Co.
- Union Mills, Lower and Upper. See Carnegie Co.
- Union Ore Co. See Republic Iron & Steel Co.
- Union Railroad Co. See Carnegie Co.
- Union Rolling Mill Co. See American Steel & Wire Co.
- Union Steel Co. See Republic Iron & Steel Co.
- Union Works. See American Steel Hoop Co.
- United Smelting & Refining Co. See American Smelting & Refining Co.
- United States Iron & Tin Plate Mfg. Co. See American Tin Plate Co.
- United States Projectile Co. (tube department). See Shelby Steel Tube Co.

V.

- Valentine Furnace. See Empire Steel & Iron Co.
- Vesta Furnace. See Susquehanna Iron & Steel Co.
- Victoria Furnace. See Empire Steel & Iron Co.
- Victoria Mine. See Republic Iron & Steel Co.
- Victoria & Western Railroad. See Empire Steel & Iron Co.
- Victor Mfg. Co. See Standard Sanitary Mfg. Co.
- Virginia & Southwestern Railway Co. See Virginia Iron, Coal & Coke Co.
- Virginia & Tennessee Coal & Iron Co. See Virginia Iron, Coal & Coke Co.
- Voegtley, F. L., & Co. See Pittsburgh Stove & Range Co.
- Vollrath, Jacob J., Mfg. Co. See Standard Sanitary Mfg. Co.

W.

Wabash Iron Co. See Republic Iron & Steel Co.
 J. G. Wagner Co. See American Bridge Co.
 Wallace, Banfield & Co. See American Tin Plate Co.
 Walters Stove Co. See Pittsburgh Stove & Range Co.
 Warner Mine. See Republic Iron & Steel Co.
 Washburn & Moen Mfg. Co. See American Steel & Wire Co.
 Washington Steel & Tin Plate Mills. See American Tin Plate Co.
 Watrous Mfg. Co. See International Silver Co.
 Watts Steel & Iron Co. See Virginia Iron, Coal & Coke Co.
 Wells & French Co. See American Car & Foundry Co.
 Wellsville Plate & Sheet Iron Co. See American Sheet Steel Co.
 Westerman-Stewart Iron Co. See Republic Iron & Steel Co.
 Western Wheel Works. See American Bicycle Co.
 West Penn Sheet Steel Co. See American Sheet Steel Co.
 Wetherald Rolling Mill. See Republic Iron & Steel Co.
 Wheeler Mining Co. See Virginia Iron, Coal & Coke Co.
 Wise County Coke Co. See Virginia Iron, Coal & Coke Co.

Wilcox Silver Plate Co. See International Silver Co.
 Williams Rolling Mill Co. See Republic Iron & Steel Co.
 Wilmington Foundry Co. See Central Foundry Co.
 Williamsburg, Pa., limestone quarries. See American Steel & Wire Co.
 Wilson-Snyder Mfg. Co. (Pipe Fitting Department). See Pittsburgh Valve, Foundry & Construction Co.
 White River Mills. See Republic Iron & Steel Co.
 White Sewing Machine Co. See American Bicycle Co.
 W. Dewees Wood Co. See American Sheet Steel Co.
 Wisconsin Steel Co. See United States Cast Iron Pipe & Foundry Co.
 Woodside Mine. See Republic Iron & Steel Co.
 Worcester Wire Co. See American Steel & Wire Co.
 Worthington, Henry R. See International Steam Pump Co.
 Wrought Iron Bridge Co. See American Bridge Co.
 Wythe & Speedwell Iron & Mfg. Co. See Virginia Iron, Coal & Coke Co.

Y.

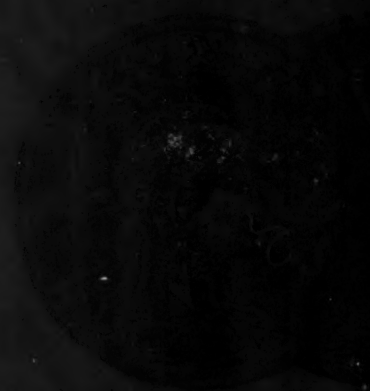
Youghiogheny Northern Railroad Co. See Carnegie Co.
 Youghiogheny Water Co. See Carnegie Co.
 Youngstown Bridge Co. See American Bridge Co.

THE IRON AGE, founded 1855, has long been recognized as the leading Trade Journal in the world. It has made more than usual progress both in circulation and influence during the past year, and stands higher than ever as an enterprising and trustworthy exponent of the metal interests. Its circulation is almost equal to the trades it represents.

It is also indicated by the number and character of its advertisements. The issue of its *Index Supplement*—a large pamphlet, sent to all subscribers—containing the names and addresses of manufacturers under 5,347 headings, embracing nearly every article in the Metal, Machinery and Hardware Trades. Although comparatively new, this is the most useful directory of these trades ever published.

RAILROADS are enormous buyers of the goods represented by the Iron Age, and their Purchasing Agents are its careful readers. Such subscriptions are hard to come by, and distinguish on our mailing lists, as they are usually placed under individual names. We have, however, charged in payment of subscriptions, identified purchases of companies operating much more than half the railroad mileage of the country, many of the important companies ordering several copies.

THE FOREIGN CIRCULATION of The Iron Age has increased during the past thirty years by a natural, healthy growth, in sympathy with the development of our export trade and the growing interest of foreigners in American manufactures. The journal has long been an important factor in introducing American goods and machinery into foreign markets, and has gained such standing in international trade that it is regularly taken by a large proportion of the foreign houses interested in the line.



THE IRON

HAS WON AWARDS

GOLD MEDAL

AT THE

PARIS EXPOSITION 1889

SILVER MEDAL, 1889

SILVER MEDAL, 1889

HIGHEST AWARD

